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Chas W Dabney Jr
Chairman

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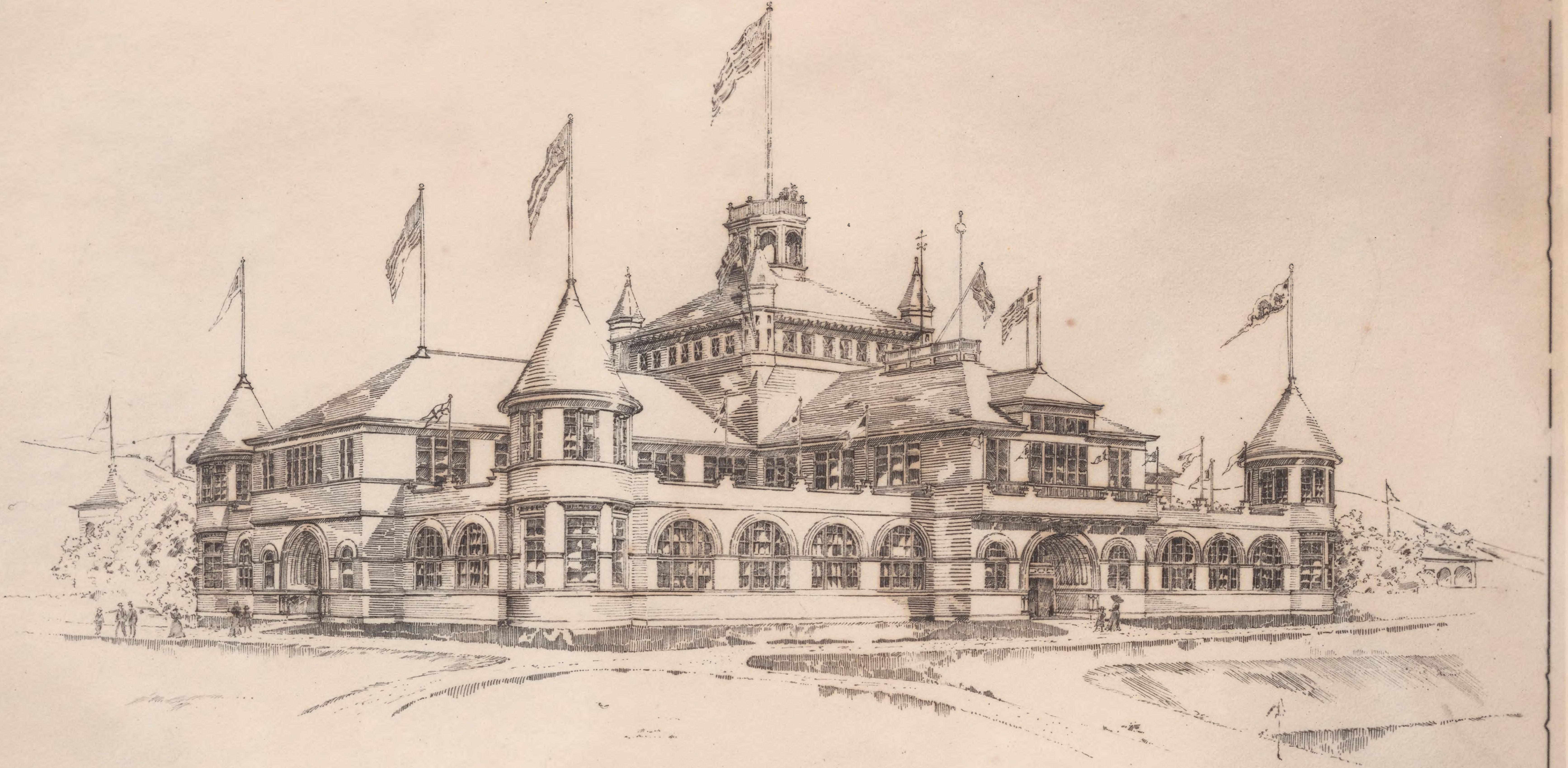

Wm Martin Aiken
Supervising Architect
Treasury Department.

U. S. GOVERNMENT BUILDING.
COTTON STATES AND INTERNATIONAL EXPOSITION.
Atlanta-Ga.– 1895.

MSS
1669 B
SCDIRB

REPORT

of the

BOARD OF MANAGEMENT

United States Government Exhibit

COTTON STATES AND INTERNATIONAL EXPOSITION

Atlanta, Georgia,

1895.

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Washington, D.C.,

1897.

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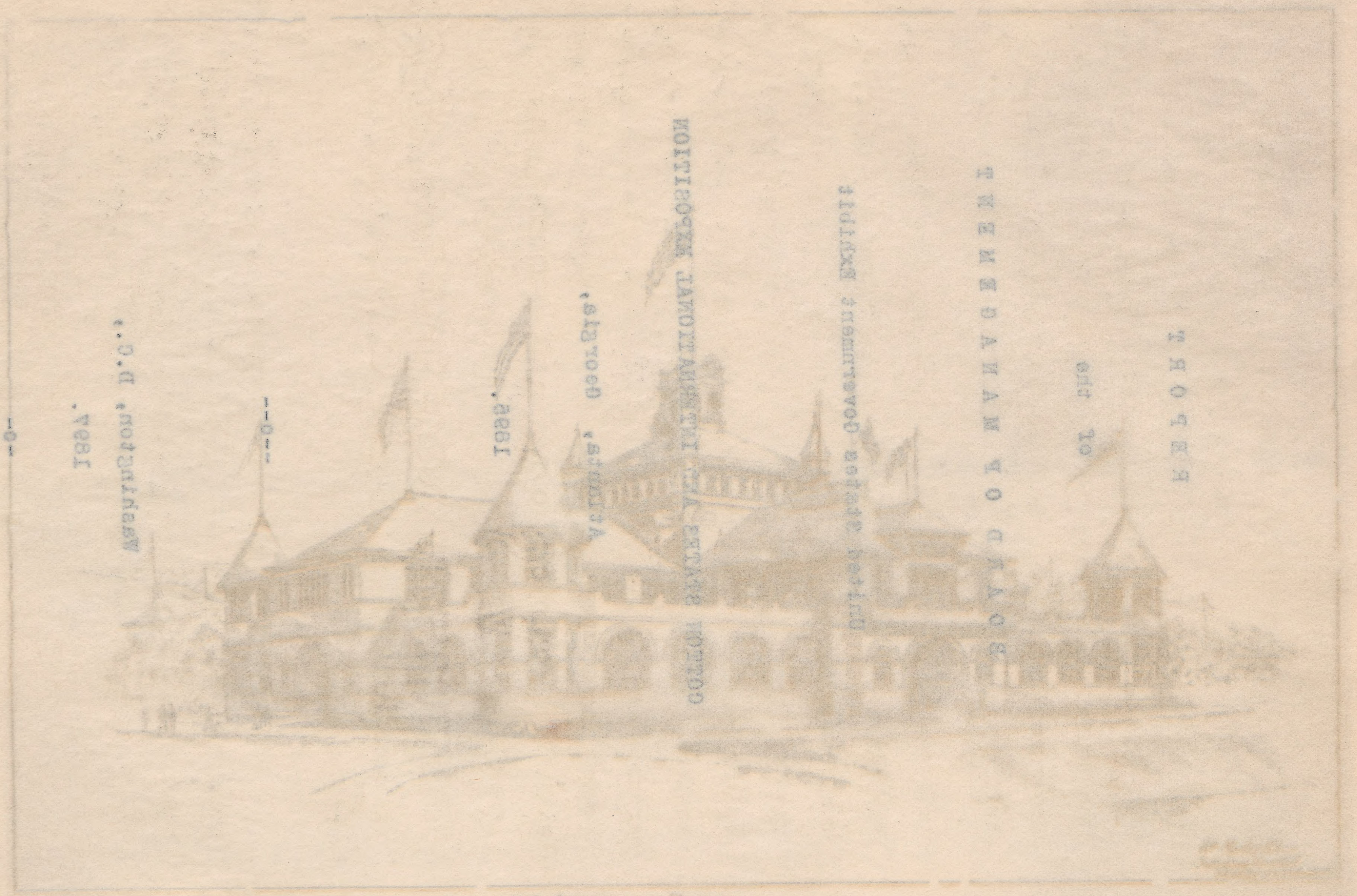
120



U.S. Government Building

Cotton States and International Exposition

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Letter of Transmittal.

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UNITED STATES DEPARTMENT OF AGRICULTURE,
Washington, D.C.

January 7, 1897.

Sir: I have the honor to transmit herewith the report of the Board of Management of the exhibit of the United States Government at the Cotton States and International Exposition held at Atlanta, Georgia, in 1895.

The Sundry Civil Act approved August 18, 1894, authorized "an exhibit by the Government of the United States of such articles and materials as illustrate the function and administrative faculty of the Government", to be selected by "the heads of the Executive Departments, the Smithsonian Institution and National Museum, and the United States Fish Commission", and appropriated $150,000 to pay the expenses of the "selection, purchase, preparation, transportation, arrangement, safe-keeping, exhibition and return" of such articles and materials. An appropriation of $50 000 was made for a building.

A building having a total floor area of 58 000 square feet was erected under the direction of the Secretary of the Treasury, at a cost of $49 700.

An exhibit was made, in accordance with the law, at a

total cost of ----------------------------------	$138 234.80
Leaving an unexpended balance of ------------	$ 11 765.20
Total appropriation----------------	$150 000.00

The law limited the portion of the above which could be expended for clerical services to $10,000. The amount actually expended for clerical services was $4,884.01.

Very respectfully,

Chas. W. Dabney Jr.
Chairman, Board of Management,
U.S. Government Exhibit.

To the President.

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REPORT
of the
Board of Management.

--o--

The exhibit of the United States Government at the Atlanta Exposition of 1895 was authorized by the following section in the Sundry Civil Act approved August 18th, 1894:

Cotton States and International Exposition at Atlanta, Georgia.

Sec.3. For an exhibit by the Government of the United States of such articles and materials as illustrate the function and administrative faculty of the Government, to be made at the Cotton States and International Exposition, to be held at Atlanta, Georgia, in the year eighteen hundred and ninety-five, and for the employment of proper persons as officers and assistants by the board of management hereinafter created, and for the maintenance of the building hereinafter provided for, and for other contingent expenses incidental to the Government exhibit, to be approved by the chairman of the board of management and by the Secretary of the Treasury upon itemized accounts and vouchers, one hundred and fifty thousand dollars, or so much thereof as may be necessary, to be disbursed by the board of management, of which not exceeding ten thousand

dollars shall be expended for clerical services. And to secure a complete and harmonious arrangement of said Government exhibit a board of management shall be created, to be charged with the selection, purchase, preparation, transportation, arrangement, safe-keeping, exhibition and return of such articles and materials as the heads of the Executive Departments, the Smithsonian Institution and National Museum, and the United States Fish Commission may respectively decide shall be embraced in said Government exhibit. The President may also designate additional articles for exhibition. Such board shall be composed of one member to be detailed by the head of each Executive Department, one by the head of the Smithsonian Institution and National Museum, and one by the head of the United States Fish Commission, and the President shall name one of said members as chairman.

But the United States shall not in any manner nor under any circumstances be liable for any of the acts, doings, proceedings, or representations of the said Cotton States and International Exposition organized under the laws of the State of Georgia, its officers, agents, servants, or employees, or any of them, or for the service, salaries, labor, or wages of said officers, agents, servants, or employees, or any of them, or for any subscriptions to the capital stock, or for any certificates of stock, bonds, mortgages, or obligations of any kind issued by said corporation, or for any debts, liabilities, or expenses incidental to the exposition; Provided, however,

That all articles which shall be imported from foreign countries for the sole purpose of exhibition at said exposition, upon which there shall be a tariff or customs duty, shall be admitted free of payment of duty, customs fees, or charges, under such regulation as the Secretary of the Treasury shall prescribe; but it shall be lawful at any time during the exhibition to sell for delivery at the close of the exposition, any goods or property imported for and actually on exhibition in the exposition buildings or on its grounds, subject to such regulation for the security of the revenue and for the collection of import duties as the Secretary of the Treasury shall prescribe; and all such articles when sold or withdrawn for consumption in the United States, shall be subject to the duty, if any, imposed upon such article by the revenue laws in force at the date of importation, and all penalties prescribed by law shall be applied and enforced against such articles and against the persons who may be guilty of any illegal sale or withdrawal; And provided further, That medals with appropriate devices, emblems, and inscriptions commemorative of said Cotton States and International Exposition, and of the awards to be made to exhibitors thereat, be prepared at some mint of the United States for the board of directors thereof, subject to the provisions of the fifty-second section of the coinage Act of eighteen hundred and seventy-three, upon the payment of a sum not less than the cost thereof; and all the provisions, whether penal or otherwise, of said coinage Act against the counter feiting or imitating of coins of the United States shall

apply to the medals struck and issued under this Section.

For taking down the Government main building erected for the Government exhibit at the World's Columbian Exposition, and its transportation, or so much of the material thereof as may be available, and its re-erection upon the site selected for the said Cotton States and International Exposition, including the purchase of such new material as may be found necessary, fifty thousand dollars, or so much thereof as may be necessary, to be disbursed by the Secretary of the Treasury; Provided, That if it be found impracticable to take down, transport, and re-erect said building for the sum herein appropriated, then the Secretary of the Treasury shall cause a new building to be erected upon said site of the Cotton States and International Exposition for the Government exhibit, at a cost not to exceed fifty thousand dollars, for which purpose the amount herein appropriated is hereby made available; Provided always, That the United States shall in no manner and under no circumstances be liable for any bond, debt, contract, expenditure, expense, or liability of any kind whatever of the said Cotton States and International Exposition, its officers, agents, servants, or employees, or incident to or growing out of said Exposition, nor for any amount whatever in excess of the one hundred and fifty thousand dollars and of the fifty thousand dollars herein authorized; and the heads of the Executive Departments, the Smithsonian Institution and National Museum, and the United States Fish Commission, and the board of

management herein authorized, their officers, agents, servants, or employees, shall in no manner and under no circumstances expend, or create any liability of any kind for, any sum in excess of the appropriations herein made, or create any deficiency.

ORGANIZATION OF THE BOARD.

An appropriation of $150,000, intended to cover the entire cost of "selection, purchase, preparation, transportation, arrangement, safe-keeping, exhibition and return" of an exhibit representing the functions of the ten great departments of the Government at an exposition extending over a period of three and a half months and located nearly seven hundred miles from the seat of Government, seemed at first totally inadequate, especially following so soon after the great Columbian Exposition at Chicago, where the National Government appropriated nearly $1,000,000 for an exhibit by the same ten departments. The conditions, however, were different. Experience had been gained at Chicago and other expositions that would avail much in planning another exhibit, and several departments that had made extensive preparations for the Chicago Exposition still found their material available; all of which made it possible to provide a large number of exhibits with only the slight expense of making a few necessary repairs. Again, experiments were no longer necessary to any extent and much time and money were thus saved by being able to carefully plan all details in the beginning and have them comply with every requirement in the end.

In compliance with law, the head of each executive department, the Smithsonian Institution and National Museum,

and the United States Fish Commission, promptly detailed a representative on the Board of Management. The ten members thus designated were as follows:

Edward I.Renick,	Chief Clerk, Department of State.
Charles E.Kemper,	Chief Executive Officer, Supervising Architect's Office, Treasury Department.
Capt. Thos.H.Barry,U.S.A.,	War Department.
Commdr.Chas.J.Train,U.S.N.,	Navy Department.
Kerr Craige,	Third Assistant Postmaster-General, Postoffice Department.
F.W.Clarke,	Chief Chemist, Geological Survey, Department of the Interior.
Frank Strong,	General Agent, Department of Justice.
Charles W.Dabney,Jr.,	Assistant Secretary, Department of Agriculture.
G.Brown Goode,	Assistant Secretary Smithsonian Institution, in charge of National Museum.
Tarleton H.Bean,	Assistant in charge Division of Fish Culture, Commission of Fish and Fisheries.

The President named Dr.Charles W.Dabney, Jr., Chairman of this Board.

On May 1, 1895, Dr.Bean retired from public service and was succeeded by Mr.W.deC.Ravenel in both positions thus vacated. At the call of the Chairman the Board met for organization on September 27, 1894. Mr.W.I.Adams was elected Secretary and Disbursing Officer and was subsequently appointed Special Disbursing Agent by the Secretary of the Treasury, furnishing bonds in the sum of Ten Thousand Dollars, and was also appointed Custodian of buildings and property.

The following committees were duly elected to supervise the details of important divisions of work:

Executive Committee:

Charles W.Dabney Jr., ex officio Chairman,
G.Brown Goode,
F.W.Clarke,
E.I.Renick,
C.J.Train.

Committee on Allotments:

F.W.Clarke, Chairman,
Charles W.Dabney, Jr,
E.I.Renick.

Committee on Installation and Decoration:

C.J.Train, Chairman,
G.Brown Goode,
F.W.Clarke.

Committee on By-laws:

G.Brown Goode, Chairman,
F.W.Clarke,
T.H.Bean.

The committee on by-laws submitted its report which was unanimously adopted, and is as follows:

BY-LAWS.

1.- Officers.

The officers of the Board shall be a chairman, a secretary and disbursing officer, and an executive committee.

2.- Duties of Chairman.

The chairman shall preside at the meetings and approve vouchers, as required by law. He shall control the expenditures of the Board so far as may be necessary to prevent any deficits; and all funds required by members of the Board shall be obtained by requisition, subject to his approval.

The chairman shall appoint all persons employed by the Board; but in the case of employes to be engaged in the work of any special department, only upon the recommendation of the representative of that department.

3.- Duties of Secretary and Disbursing Officer.

The secretary shall keep the records of the meetings of the Board, and conduct its correspondence under the direction of the chairman. He shall also act as disbursing officer, and perform such other duties as may be assigned to him by the chairman.

4.- Duties of Executive Committee.

The executive committee, of which the chairman of the Board shall be chairman ex officio, shall be elected by the Board, and any vacancies shall be filled by election. The committee shall act upon matters of urgent business in the intervals between the meetings of the Board, and their action shall be binding upon the Board until its next meeting, and until then only, unless at that meeting approved and sanctioned.

5.- Meetings.

Meetings shall be held at least once a month upon the call of the chairman. It shall be the duty of the chairman to call a special meeting upon the request, in writing, of three members of the Board.

Through the courtesy of the Director of the Geological Survey, office room was granted the Board gratuitously until December 1, 1894, when two rooms were rented elsewhere in the

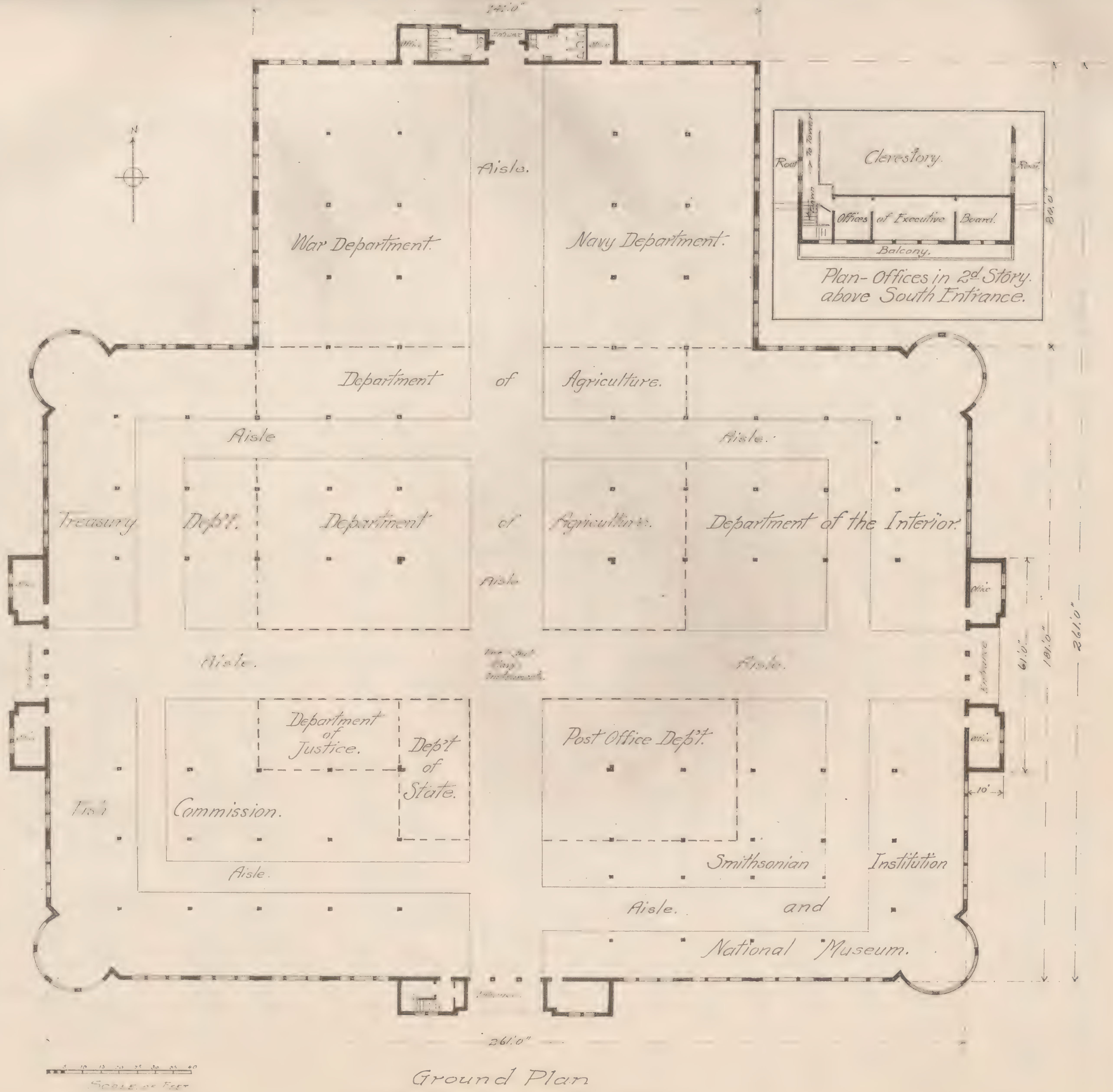
city of Washington at $40 per month. They were retained as such until the office was transferred to Atlanta on August 5th. After the exhibits were re-shipped from Atlanta the office of the Board was established in rooms at the Agricultural Museum in Washington, and on May 1, 1896, the office was abolished.

THE GOVERNMENT BUILDING.

The original plans for the building to be constructed for containing the Government Exhibit, as prepared in the office of the Supervising Architect, represented a building 260 by 180 feet inside measurement, and bids were solicited on that basis. When opened and compared the lowest bid was $27,446.00 or a little more than half the amount authorized for the purpose. The Board, therefore, requested the Supervising Architect to submit plans for an annex, and the building was finally increased by an addition to the centre of the north side, 80 feet on the north and 140 feet east and west, thus providing 11,200 feet additional space, or a total floor area of 58,000 square feet.

The building was, on account of its location and size, the most prominent architectural feature of the Exposition, and for its admirable design and satisfactory completion credit is due to the office of the Supervising Architect, Treasury Department.

The surface occupied by the building, exterior measurement, represented an area of 60,360 square feet, and as the $50,000 appropriated for the construction of the building was expended with the exception of $300, the cost per foot of total area was eighty-two cents.



Ground Plan
U. S. Government Building.
Cotton States & International Exposition.
Atlanta, Ga.
1895.

Wm. Martin Aiken.
Supervising Architect.
Treasury Dep't.

The extreme dimensions of the main building were 181 feet by 261 feet, and of the annex or rear wing, 80 feet by 141 feet. Height from main floor to roof of one-story portion, 25 feet; height from main floor to top of main clere story roof 63 feet; height from main floor to deck of lantern surmounting central tower, 108 feet.

The structure of exterior from footings to apex was long leaf yellow pine, and cast iron and steel were used in combination with wood for the large trusses of the main roof and for tie-rods and anchors. The footings were proportioned to bring a pressure of three tons per square foot on the soil, and the floors were constructed to carry 200 pounds per square foot. All material where exposed on the interior of the building was dressed and finished with a coat of linseed oil.

Numerous ladders, fixed and portable, were provided for use in case of fire and other emergencies, and the ridges of the roof were formed of 10-inch planks to afford a safe footing for firemen and others.

An abundance of light was secured through numerous large windows, the sash in which were movable for purposes of ventilation.

Many flag poles were so placed as to be of easy access, and, being of different lengths, were well fitted for the display of flags of different sizes.

On the main roof, south front, was constructed a platform to accomodate the Time Ball which formed a portion of the Navy Department exhibit, and this platform was also used for the instruments of the Weather Bureau in making daily observations.

The lantern surmounting the central tower was easy of access, and afforded a complete view of the exposition ground and an effective location for the search light, which was used on nights of special fetes.

The Exposition authorities bore all expense of preparing the building for water and sewage, wiring the building for arc lights in the offices and the aquarium, and furnished water and electrical current for lights and motive power, free of charge to the Board.

The cost of installation of 300 electric lights on the exterior of the building for illuminating at night, conforming in this respect to all buildings of the exposition, was paid from the building fund at $2.50 per light. This was the only expense either to the building fund or the appropriation for the exhibit, on account of electric installation or current.

The problem of heating the offices in the Government building as the weather became cold in November, was a serious one. It was proposed to use coal stoves and also oil heaters, but both were deemed unsafe, and it was finally decided to use gas. Each office was supplied with one or more large heaters, and piping was connected from the gas main and extended around the inside of the building in such a manner as to be unnoticeable, and the method proved highly satisfactory.

While the building was of a temporary character, it was constructed in a thoroughly substantial manner, so that no life of the many thousands who visited it, and none of the valuable exhibits housed therein, should be imperiled. Accompanying this report is a ground plan of the building, showing

the distribution of space to the several departments of the Government.

ALLOTMENT OF SPACE.

The main aisles through the centre of the building, running east and west and north and south, were uniformly 20 feet wide, and subordinate aisles running around the main portion of the building about twenty feet from the walls were 12 feet wide, with the exception of the aisle through the Fish Commission space, which, on account of the 12 foot space through the grotto in which the aquarium was located, was only 8 feet wide. The space allotted to each Department, including all passages except the main aisles as above stated, was as follows:

Department of State,	800	feet
Treasury Department,	4800	"
War Department,	4800	"
Navy Department,	4800	"
Postoffice Department,	2156	"
Department of the Interior,	6400	"
Department of Justice,	800	"
Department of Agriculture,	8000	"
Smithsonian Institution and National Museum,	7444	"
U.S.Fish Commission,	8000	"
Main aisles,	10000	"
Total floor space, ...	58000	"

At the dividing lines between exhibit spaces allotted to departments, strong partitions were constructed uniformly 12 feet in height; thus affording excellent wall space that could

not otherwise have been obtained, for hanging maps and portraits. This added greatly to the finished appearance of each departmental exhibit.

No provision was made for exhibit space in galleries, experience at past expositions having shown that it is a waste of time and money to install exhibits where the visitor must ascend stairs to look at them.

Offices were located as indicated on plan, and additional office space was obtained in the open galleries over the main entrance to the building. The offices of the Board were located over the South entrance; the offices of the Departments of the Interior, Agriculture, and Smithsonian Institution and National Museum on the East front; offices of the Treasury, Postoffice and Fish Commission on the West front; War and Navy offices on the North front, and the Departments of State and Justice had desks arranged in their exhibit spaces on the floor.

Exhibits were already arriving daily when the office of the Board was transferred to Atlanta, although the contractors did not complete their work on the final details of the building for several weeks thereafter.

ALLOTMENT OF FUNDS.

Of the $200,000 appropriated by the act providing for the Exposition, $50,000 was set aside, in accordance with the law, for the removal of the Government building at Chicago to Atlanta, or the erection of a new building, leaving $150,000 for the preparation, installation, maintenance and return of the various exhibits, which sum was allotted by the Board to

the various departments as follows:

Department of State,	$2 500
Treasury Department,	10 000
War Department,	14 000
Navy Department,	12 500
Department of the Interior,	19 500
Postoffice Department,	4 000
Department of Justice,	2 000
Department of Agriculture,	23 000
Smithsonian Institution and National Museum,	22 000
U.S.Fish Commission,	23 000
Common fund,	17 500
	$150 000

STORAGE.

Empty packing boxes were stored outside the enclosure under a special contract which required them to be removed from the building when empty, stored during the term of the exposition, and returned to the building when needed--all at the rate of two and a half cents per cubic foot. The price was reasonable and the service, in the main, satisfactory. The total cost of this service was $1044.67 and the cubic measurement of packages stored by each Department was as follows:

Department of State,	565 feet
Treasury Department,	4536 "
War Department,	2809 "
Navy Department,	4144 "

Postoffice Department,	3085	feet
Department of the Interior,	8096	"
Department of Justice,	636	
Department of Agriculture,	6501	"
Smithsonian Institution and National Museum,	6200	"
U.S.Fish Commission,	4921	"
Secretary's Office,	281	"
Total cubic feet, ...	41744	"

ADMISSION TO GROUNDS.

Admission tickets to the Exposition Grounds were issued to the public at fifty cents per capita, except children under twelve years of age, who were admitted at twenty-five cents. The Exposition Management made no charge for entrance to the Exposition Grounds for Government officials or employees of the Government Exhibit, and upon requisition of the Secretary of the Government Board, complimentary cards or orders for photograph passes were issued for the full term or for such specific term as required.

TRANSPORTING THE EXHIBITS.

As early as March, 1895, a pamphlet was issued by the Transportation Department of the Exposition to the effect that the freight traffic associations of the country had agreed to transport material destined for the Exposition at customary rates and granting the privilege of free return to original point of shipment after the close of the Exposition. A terminal charge of six cents per hundred pounds each way, or a min-

imum on any one shipment of fifty cents, was assessed for transfer of exhibits between Atlanta and the Exposition grounds. This charge included unloading and placing exhibits as near as practicable to the spaces to be occupied, and the loading of exhibits in cars for re-shipment after the close of the Exposition.

The Southern Railway Company extended its tracks to the side of the Government Building, and not only were the carloads of exhibits delivered to the building intact, but materials used in construction as well.

In April, 1895, by direction of the Board, the Secretary of War was asked to instruct the Quartermaster of the Army stationed at Atlanta, to take charge of receiving and re-shipping freight pertaining to the Government exhibit, and the request being promptly granted, Major John L.Clem, U.S.A., was instructed to take charge of all transportation matters. At his request Mr.John Shelton, a retired Commissary Sergeant of the Army, was engaged as Transportation Clerk at the rate of $65.00 per month, and the affairs of this department were conducted in a most satisfactory manner, no single piece having been lost and nothing broken which could in any way be attributed to the neglect of the men in charge. This branch of the service completed its duties on February 15, 1896, one week after the last package of Government property had been shipped from the Exposition grounds.

The following information may be of interest as a matter of statistics, showing the difference between the amount of material received at Atlanta for the Government exhibit and the amount shipped after the conclusion of the Exposition.

Goods Received:

Date of first delivery to Government Building June 6,1895.

Total number of car loads,	97
Total number of packages,	3,093
Total number of pounds,	935,081

Goods Shipped:

Last shipment February 8, 1896.

Total number of car loads,	68
Total number of packages,	2,655
Total number of pounds,	834,502

The difference between the receipts and shipments is accounted for by the fact that many of the cases and much of the exhibit material could not, for lack of accomodations, be stored in the Government buildings at Washington, and was therefore temporarily loaned to museums and educational institutions in the South, with the understanding that when required it would be returned upon the surrendering of receipts by the several departments holding them. Considerable material and supplies used in installation and care of exhibits were also transferred to Fort McPherson for the use of the Army Post, and receipts signed by the representative of the War Department on the Board of Management were duly filed at the Treasury Department.

GUARDING AGAINST FIRE.

The fire department,when finally established,was efficient and rendered excellent service. All the buildings being constructed of pine, rich with pitch, painted on the outside and oiled within, were exceedingly inflammable, but owing to good fortune and quick response by the firemen when an alarm was given, only two fires of importance occurred on the grounds

during the entire term of the Exposition, one of which, unfortunately, caused a death. During the early installation period while shavings and inflammable materials were scattered about, the danger of fire was very great, and the fire department not being fully organized, the Government board authorized two hose connections to be made in the Government building, and a sufficient quantity of two and half inch hose was arranged for ready use in case of necessity, the water pressure being sufficient without the use of a pumping engine to throw astream to any part of the building. After the Exposition opened, the Government building was furnished by the Exposition company,free of expense, a number of chemical extinguishers, which were disposed in convenient positions ready for use at any moment. One large extinguisher on wheels was located in one of the main aisles near the center of the building, fully equipped and charged for use.

The infantry camp near the Government building was composed of two companies of United States troops detailed from Fort McPherson, and while they would have been of great assistance in the event of a fire or other emergency, the officers in command could not spare enough men from camp duty to serve regularly as guards in the Government building. The Exposition authorities were also unable to supply sufficient officers for policing the buildings and grounds. The Board of Management was, therefore, compelled to employ watchmen or guards for the protection of the Government property at the expense of the appropriation, who were suitably uniformed and did duty on three daily shifts of eight hours each.

The building force consisted of a Superintendent, Assistant Superintendent, ten (10) watchmen, five (5) porters, or cleaners, and one (1) janitress. One of the watchmen was an experienced electrician and had immediate supervision of the electric lamps and switches, and made frequent inspection of the wires.

The entire force of watchmen occupied tents in rear of the building for sleeping quarters during September and October, and subsequently occupied the north roof turrets of the building. By this arrangement all the watchmen, whether on duty or not, were always accessible in case of necessity.

COST OF THE GOVERNMENT EXHIBIT.

Appended is a classified statement of expenditures covering the entire cost of preparation, installation, maintenance and transportation of the Government exhibit.

Statement of Expenditures:

Travel and subsistence	$22 725.93
Clerk hire	4 884.01
Salaries of officers & assistants other than clerks,	7 251.96
Salaries of force for guarding and cleaning building,	5 007.90
Freight, terminal, express and drayage	14 927.27
Material and labor for preparation, installation, maintenance and return of exhibits,	77 348.77
Interior decoration,	1 439.50
Stationery and printing,	1 074.54
Telegraphing,	183.05
Rents,	564.75
Storage of packing cases,	1 044.67
Office furniture and fixtures,	842.71
Miscellaneous,	939.74
Total	138 234.80
Unexpended balance,	11 765.20
Appropriation for exhibit,	150 000.00

It will be seen from the above table that there still remains unexpended $11 765.20 of the exhibit fund, all of which, with the exception of a few minor expenditures aggregating perhaps one hundred dollars, will be covered back into the Treasury. While the law placed a limit for clerk hire at $10 000, only $4 884.01 was expended for such service

The total amount expended by each Department under direction of its representative is given below.

Department of State - - - - - - - - - - - - - - - - -	$2 777.99
Treasury Department - - - - - - - - - - - - - - - - -	8 884.58
War Department - - - - - - - - - - - - - - - - - - -	5 021.37
Navy Department - - - - - - - - - - - - - - - - - - -	11 260.73
Postoffice Department - - - - - - - - - - - - - - - -	2 476.32
Department of Justice- - - - - - - - - - - - - - - --	2 357.77
Department of the Interior- - - - - - - - - - - - - -	22 022.33
Department of Agriculture - - - - - - - - - - - - - -	20 135.59
Smithsonian Institution & National Museum- --	24 246.73
Fish Commission - - - - - - - - - - - - - - - - - - -	20 689.80
General Fund -	18 361.59
Total - - - - - - - - - - - - - - - - - -	138 234.80

The amount of $18 361.59 expended under the designation of "General Fund" represents the expenditure that could not properly be classified as belonging to the ten exhibiting departments. These expenditures consisted of the salary of the Secretary and Disbursing Officer, clerks in the office of the Board, superintendent, watchmen and janitors, rent of offices, stationery and printing, decorations of the interior of the building, water connections for fire protection, gas supply for heating office rooms, and other expenditures of a similar character.

PERSONAL DETAIL.

The total number of persons detailed from the several

departments during the entire progress of preparation and maintenance of the exhibit, and who, while absent from their homes, were re-imbursed their subsistence expenses, amounted in the aggregate to 121. The number detailed from each exhibiting department was as follows:

Department of State,	2
Treasury Department,	27
Navy Department,	6
Postoffice Department,	4
Department of the Interior,	27
Department of Justice,	3
Department of Agriculture,	24
Smithsonian Institution and National Museum,	16
Commission of Fish and Fisheries,	12
Total- - - - - - - - - - - - -	121

The rate of subsistence which each person was not allowed to exceed varied according to the length of detail and the nature of service performed. The Secretary of the Treasury placed the maximum limit per diem at five dollars, but this expenditure was not found to be necessary except in two or three instances, $3.50 being found sufficient for satisfactory accomodations, and in many cases $2.50 and even $2.00 per diem was found sufficient to meet living expenses when a detail extended over a period of one month or more.

The larger number of details were made necessary during the installation period and also while the exhibits were being dismantled and packed for return.

The War Department representative provided for the installation and care of his exhibit principally by causing the transfer of non-commissioned officers and enlisted men, who were subsisted from the appropriations for maintenance of the army, and no subsistence expenses were incurred by that department payable from the appropriation for the exhibit.

The Board of Management records with regret the death, during the progress of this work, of one of its most distinguished and experienced members, Dr. George Brown Goode, Representative of the Smithsonian Institution and National Museum, and also of two of its most capable and efficient officers, Mr. Robert Edward Earll and Mr. Renick Seymour Matthews, both of whom were associated with Dr. Goode in the installation and care of the Smithsonian exhibit. By resolution of the Board a suitable notice of the life and services of each of these gentlemen is appended to the report of the Smithsonian Institution, which was prepared and submitted by Dr. Goode.

A list of awards to the Departments and those connected with the Department exhibits, is appended hereto and made a part of this report.

CHARLES W. DABNEY, Jr.,

Chairman.

W.I.ADAMS,

Secretary.

LIST OF AWARDS.

The following is a list of awards by the Board of Awards of the Exposition to United States Government departments, bureaus, and individuals whose services were especially recognized in the preparation and arrangement of the Government exhibits:

DIPLOMA OF GRATEFUL RECOGNITION and GOLD MEDAL

to the

Department of State,
Treasury Department,
War Department,
War Department, Quartermaster's Department,
Navy Department,
Postoffice Department,
Department of the Interior,
Department of Justice,
Department of Agriculture,
Smithsonian Institution,
Commission of Fish and Fisheries.

GRAND PRIZE and GOLD MEDAL.

to the

Treasury Department,	Life Saving Service.
War Department,	Signal Service, Engineer Corps, Ordnance Bureau.
Navy Department,	Bureau of Construction, Ordnance Bureau.

Department of the Interior,	Patent Office, Bureau of Education, Geological Survey.
Department of Agriculture,	Division of Vegetable Pathology. Office of Experiment Stations, Division of Entomology, Division of Ornithology and Mammalogy (Biological Survey), Bureau of Animal Industry, Weather Bureau.
Smithsonian Institution,	
Smithsonian Institution,	Bureau of American Ethnology.

National Museum.

Commission of Fish and Fisheries.

Dr.W.O.Atwater.

Dr.David T.Day,

Dr.B.E.Fernow,

Prof.Thomas Wilson.

DIPLOMA OF HONOR and GOLD MEDAL,

to the

Treasury Department,	Light House Establishment, The Mint.
Department of the Interior,	Bureau of Education, Bureau of Indian Affairs
Department of Agriculture,	Forestry Division, Fiber Investigations, Road Improvement.

DIPLOMA OF GENERAL EXCELLENCE and SILVER MEDAL

to the

Treasury Department,	Coast and Geodetic Survey.

DIPLOMA OF HONORABLE MENTION

to the

Navy Department, Naval Observatory, for dropping time ball.

Dr.B.E.Fernow,

Capt. C.D.Sigsbee, U.S.N.

Capt. Z.L.Tanner, U.S.N.

Dr.Charles Mohr,

Dr.G.Brown Goode,

Mr.Geo.B.Sudworth.

DIPLOMAS OF HONORABLE MENTION TO COLLABORATORS

of various exhibits as follows:

Mr.E.W.Parker,

Dr.William C.Day,

Dr.C.F.Dawson,

Dr.L.O.Howard,

Mr.C.L.Marlatt,

Dr.C.Hart Merriam,

Mr.C.E.Coville,

Mr. G.H.Hicks,

Mr. A.J.Pieters,

Mr.L.H.Dewey,

Mr.Thomas Taylor,

Professor B.T.Galloway,

Dr.Erwin F.Smith,

Professor Albert F.Woods,

Mr.Jefferson Middleton,

Professor F.W.Clarke,

Professor C.F.Marvin,

Dr.L.O.Howard,

Mr.D.W.Coquillett,

Professor W.W.Carson,

Gen.Roy Stone,

Mr.E.G.Harrison,

Mr.S.T.Neely,

Mr.T.W.Sweeney,

Mr.W.J.McGee,

Mr.Walter Hough,

Professor O.T.Mason,

Professor Thomas Wilson,

Mr.Merton B.Wait,
Miss D.G.Passmore,
Mr.W.H.Prestele,
Miss Lillie Sullivan,
Mr.P.Howard Dorsett,
Dr.A.K.Fischer,
Mr.W.A.Taylor,
Mr.G.B.Brackett,
Mr.J.W.Henley,
Miss Amanda A.Newton,
Prof.Milton Whitney,
Dr.A.C.True,
Mr.George W.Hill,
Mr.J.A.Arnold,
Mr.C.R.Dodge,
Mr.C.W.Richmond,
Prof.C.V.Riley,
Mr.C.A.D.Woltz,
Mr.Wirt Tassin,
Mr. J.E.Watkins,
Mr.J.E.Benedict,
Mr.Barton A.Bean,
Mr.E.P.Upham,
Mr.J.W.Scollick,
Mr.William Dinwiddie,
Prof.F.W.True,
Mr.Joseph Palmer,
Mr.William Palmer,
Mr.R.S.Matthews,
Prof.F.A.Lucas,
Mr.Theodore A.Mills,
Dr.Cyrus Adler,
Mr.C.A.Steuart,
Mr.C.F.W.Bergman,
Mr.Henry Horan,
Mr.M.L.Linell,
Mr.I.M.Casanowicz,
Mr.W.V.Cox,
Mr.Leonard Stejneger,
Mr.Paul Brockett,
Mr.Geo.P.Merrill,
Mr.W.C.Winlock,
Mr.R.E.Earll,
Mr.C.T.Simpson,
Mr.Robert Ridgway,
Mr.T.W.Smillie,
Mr.Charles Schuchert.

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REPORT OF THE REPRESENTATIVE
# of the
Department of State.

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Of the $150,000 available for the preparation, installation and return of exhibits by the various executive departments of the Government, the Smithsonian Institution and National Museum, and the U.S.Fish Commission, the sum of $2,500 was allotted by the Board of Management to defray the expenses of the exhibit of the Department of State, and of the 58,000 feet of available floor space in the Government Building, 800 feet were assigned the Department for the proper arrangement of its display.

Mr.John M.Biddle, a clerk of Class 1, Department of State, was appointed Chief Special Agent by the Secretary of State and detailed to assist the Representative in the preparation, installation and maintenance of the exhibit. It was also found necessary to employ a messenger who was a resident of Atlanta. Owing to the fear of destruction by fire, the Representative thought it wise to exhibit only a few valuable documents, and placed them so that they could be readily removed in case of danger. The originals of very valuable historical documents were not taken from the Department, but artotypes of a few of them, made by Mr.E.Bierstadt, of New York, were used instead. These were so well executed that it was difficult to tell them

from the originals, so that for the information of the visitor the display was to all intents and purposes fully as valuable as if the originals had been on exhibition. The exhibit included portraits of the Presidents of the United States, a photograph of the Executive Mansion at Washington, and an illustration of the working of the President's office by the exhibition of blank forms of nominations to the Senate, the seal of the President's office, engraved blanks for official entertainments by the President, blank forms for referring communications to the executive departments, samples of the stationery used in the President's office, blank warrants authorizing the Secretary of State to affix the seal of the United States to executive instruments, and blank commissions for the appointment of cabinet officers, diplomatic officers, and others. The workings of the various bureaus of the State Department were also illustrated by a display of the various printed forms in use in official business. There were also letters from the heads of foreign governments to the President of the United States, pictures of the several buildings occupied by the Department of Foreign Affairs and the Department of State, and of the site of the city of Washington when it was adopted as the seat of government. The presentation to the United States of the statue by Bartholdi of Liberty Enlightening the World, now standing in the harbor of the city of New York, was illustrated by the exhibition of the original deed of gift to the United States and the paper showing the acceptance of the gift. On the partition walls surrounding the exhibit were various maps showing the growth of the diplomatic and consular representation of the United States in

foreign countries, and maps showing the expansion of the territory of the United States under treaty provisions. The visitor had also an opportunity of examining the proclamations by the various presidents of the United States, a facsimile of the Declaration of Independence, and of the rough draft of the Declaration of Independence by Thomas Jefferson with interlineations in the handwriting of Adams and Franklin. There were portraits of the signers of the Declaration of Independence and photographs of Monticello, near Charlottesville, Va., the home of Jefferson. The original constitution of the United States, now deposited in the Department of State, being too valuable for removal, a photographic reproduction was on exhibition, together with print likenesses of the members of the convention which framed the constitution. There were also a statuette of George Washington, swords presented to the United States by Japan, and a collection of gold medals presented to this country by foreign powers, with other interesting and valuable relics, state papers, etc.

Notwithstanding the careful handling of the articles exhibited, some of them, owing to their age, received injury. Such relics as Washington's and Jackson's swords, Franklin's staff, the papers of Washington and other early statesmen, and like articles kept on exhibition in the Library of the Department of State, should not, in the opinion of the Representative, be removed for purposes of display at expositions in the future, owing to their extreme liability to injury or loss. Besides valuable relics of this kind, there is so little in the State Department suitable for exhibition that the Representa-

tive has deemed it his duty to recommend to the Secretary of State that the Department be not represented in any government exhibit in the future.

E.I.RENICK,

Representative, Department of State.

REPORT OF THE REPRESENTATIVE
of the
War Department.

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In compliance with the act of Congress authorizing an exhibit by the War Department, the following order was issued:

Headquarters of the Army,
Adjutant General's Office,
Washington, August 31, 1894.

Special Orders
No. 205.

Extract.

7. The following order has been received from the War Department:

War Department, Washington, August 30, 1894.

In compliance with Section 3 of the Act of Congress approved August 18, 1894, entitled "An act making appropriations for Sundry Civil Expenses of the Government for the fiscal year ending June 30, 1895, and for other purposes" Captain Thomas H. Barry, 1st Infantry, is hereby detailed to represent the War Department as a member of the Board of Management of the Exhibit by the Government of the United States to

be made at the Cotton States and International Exposition, to be held at Atlanta, Ga., in the year 1895.

Joseph B. Doe,
Acting Secretary of War.

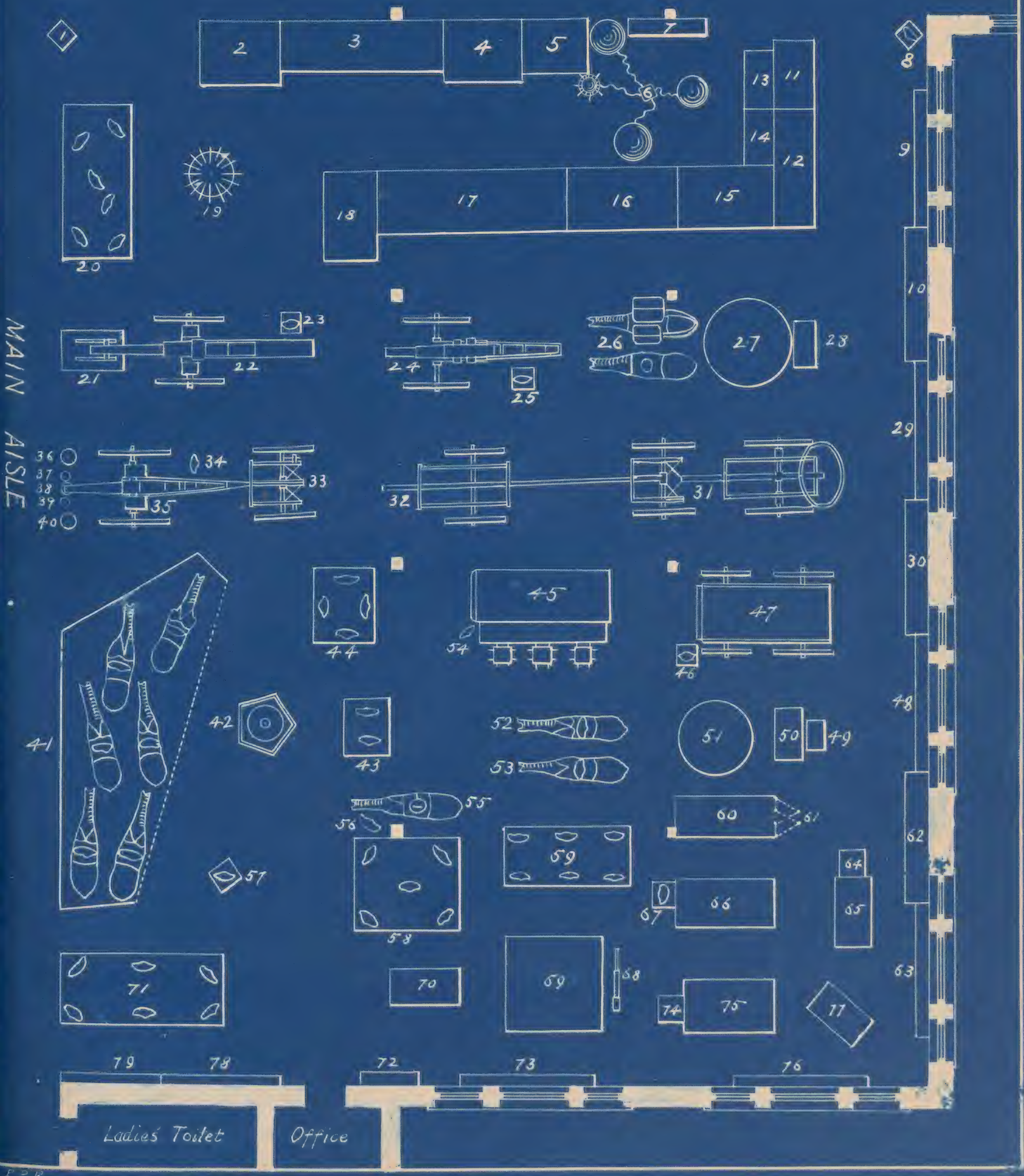
By command of Major General Schofield:
Thomas M. Vincent,
Acting Adjutant General.

Letters were accordingly addressed by the representative thus detailed, to the chiefs of the several bureaus of the War Department, calling for a statement of the articles which could be advantageously exhibited by each bureau, and suggestions were invited as to the character, preparation and display of the same. The Board of Management allotted to the War Department for the expenses of its exhibit $14,000, and 4800 square feet of floor space for the display. After consideration of the replies of the several chiefs of bureaus in connection with the available funds and floor space, it was decided to have prepared for exhibition the articles suggested by the Quartermaster-General, the Chief of Engineers, the Chief of Ordnance and the Chief Signal Officer. Exhibits by the Medical and Subsistence Departments, consisting of a complete field hospital and field commissary, respectively, to be displayed in connection with an encampment of two companies of the 5th Regiment of Infantry from Fort McPherson, were also approved by the Secretary of War.

In order that the arrangement and location of the several articles exhibited may be clearly understood, a floor plan of the exhibit accompanies this report.

PLAN OF
WAR DEPARTMENT EXHIBIT
ATLANTA EXPOSITION

SCALE: 10″ = 1″



F.P.E.

BLUE PROCESS PRINT,
FRED. A. SCHMIDT,
[illegible] ST., N. Y.

The following popular description of the exhibit, which is abridged from an article which appeared in one of the leading newspapers of the country, will give a fair general idea of the collection as a whole.

"In the exhibit of the War Department there are uniforms, trimmings, equipments and swords, flags, guidons and rifles, pictures showing the various army posts, pack mules, army wagons, General Thomas' office wagon, Custer relics, revolutionary banners, silken colors belonging to regiments, battalions, armies, corps, divisions and brigades. A case of chevrons enables one to spot all the non-coms you may meet in going from one end of the land to the other. This sturdy figure with matchlock and rest on his shoulder is a Puritan soldier of 1620, who, we may assume, is on his way to destroy Indians and lay the foundation for trouble that has endured right up to this very year. Then we come upon a group of Revolutionary officers and men, only we imagine that in those hard days the average of the army did not look quite so spick-and-span or so thoroughly cap-a-pie. The 1812 squad is hardly so attractive. Trousers were coming in and they were very unpleasant. Then we find how our army looked during the Mexican war, when the dress was rather scant and boyish, while another little company reveals the change and possibly the advance they made up to 1852. Still another group illustrates the soldiers of the civil war and it takes several gatherings to show what the army is like at present. We have a general,

said to represent Schofield, in all the splendor of gold lace and other frills to which his rank entitles him, and following him a glittering staff, line officers, the rank and file of various branches, a colored cavalryman, a cavalry scout and a mounted Indian trooper. The Ordnance Department sends a number of queer old weapons, foreign trophies and gifts, as well as native products, and there is a case of rifles that have burst from gas, overcharges or obstructions. Here is an armor piercing shot for a 12-inch rifle that weighs half a ton and is fired by 450 pounds of powder, with other shot grading down in weight to 12 1-2 pounds. There is a 7-inch siege howitzer, a 5-inch siege gun and carriage, a 3 6-10 inch field mortar and carriage, a battery gun of smaller bore, with caisson, battery wagon, forge and limber, 25 carbines and 3 musketoons of American and foreign make, and several rifles and carbines taken from battlefields or captured from hostile Indians. The engineer section contains models of a gun lift battery, barbette battery, mortar battery, dams, locks, Key West Harbor, spar bridge and torpedoes. There is something uncanny in the idea of these disappearing guns that pop out suddenly from unexpected banks, blow your head off and silently sink back into the earth and nobody says anything. The mortars in their square pits could also be very unpleasant, for they can deliver a fire of sixteen shells in a volley, or can drop them around where they will do the least good, one at a time.

"There is one part of the army exhibit that is of

strong and pathetic interest. It is that of the Greely expedition relics. While it is the business of the soldier to charge into the imminent deadly breach, when told to do so, there is a certain excitement that carries him through a battle, but in the far North, out of the reach of all their fellow men, even the savage ones, abandoned and disappointed, left with no shelter but a hut and a tent, the little band of American soldiers had to face death in a slower and more dreadful form, and one by one they fell victims to it -- starvation -- until a mere handful remained. Had the rescue party been a day or two later there might not have been a survivor and no exhibit here."

In connection with the exhibit as above described the following enlisted men were on duty:

Post Quartermaster Sergeant J.J.Hittinger,
Sergeant Frederick Mayer, Battalion of Engineers,
Private Charles Muller, Battalion of Engineers,
Sergeant Thomas F. Thorpe, Ordnance Department,
First Class Sergeant C.O.Hastings, Signal Corps,
Sergeant Henry W. Stamford, Signal Corps.

Commissary Sergeant John Flach was detailed for duty with the camp commissary.

Commutation of rations at $1.50 per day was paid to these men by the Subsistence Department; quarters at the rate of one room each and fuel were furnished them by the Quartermaster's Department. These allowances were necessary and

were found to be sufficient. Excepting the Representative, no commissioned officers were on duty with the exhibit. Every effort was bent to make the exhibit complete and thoroughly illustrative of the functions and administrative faculty of the Department, and it is believed that this was accomplished with the minimum expenditure of the fund allotted. The entire Government exhibit was thoroughly examined by the President of the United States and the members of his cabinet, in view of which fact the Representative deems comment as to the sufficiency, appropriateness and general character of the exhibit to be unnecessary.

Of the $14,000 originally allotted to this Department by the Board, about $9,000 was the balance available after deducting all expenses. This saving was made by reason of the economic administration of the expenditures for material, and especially for labor. No persons were employed unless their services were necessary and indispensable.

In view of the probability of future exhibits of this kind by the War Department, the Representative deems it not out of place to add here the following conclusions drawn from the experience gained in the preparation, installation and return of the exhibit of the War Department at the Cotton States and International Exposition:

The legislative act appropriating moneys for Government exhibits at expositions should apportion the amounts to the several executive departments. Then any savings made by

any one or more departments can not be diverted to other purposes, and must revert to the Treasury of the United States. The Board of Management is thereby spared the task of allotting the appropriation, which can not be done to the satisfaction of all concerned, and which causes more or less friction and complaint.

For an exposition of the general scope, character and duration of that recently held at Atlanta, Ga., one hundred thousand dollars economically disbursed will be all sufficient for a comprehensive and complete exhibit by the Government and fifty thousand dollars is sufficient for the construction of a suitable building.

Ten thousand dollars will be ample to meet all proper expenses of an exhibit by the War Department.

One commissioned officer in general charge and a few non-commissioned officers, are a sufficient force for duty in connection therewith.

The legislative act providing for a Government exhibit should provide the same allowances for subsistence, transportation, etc., to the Army and Navy members of the Board of Management, as are made to civil members.

THOMAS H. BARRY,
Captain 1st Infantry,
Representative, War Department.

REPORT OF THE REPRESENTATIVE
of the
Navy Department.

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The Board of Management of the United States Government Exhibit, on which, by the Department's order of October 1, 1894, the undersigned was the Representative of the Navy Department, assigned the Navy Department from the $150,000 appropriation by the Government, the sum of $12,500 to provide for the expenses of its exhibit, $500 of which was afterwards turned over to the Representative of the Department of Justice, because not needed by the Navy Department. For an exhibiting space the Navy was given the eastern half of the north wing of the building, 80 feet long and 60 feet wide. It was plain that in so small a space exhibits from each of the different bureaus of the Department would be impossible, and it was, therefore, decided to confine the exhibit to the Bureaus of Construction and of Ordnance, and to select such articles for exhibition as would enable the spectators to readily understand the various changes and advance in ship building for military purposes, and in ordnance construction from the first days of the century to the present day.

Through the kindness of the Chief of the Bureau of Construction, the Representative was enabled to exhibit the

superb collection of models of the vessels of the new navy belonging to that Bureau, and the Superintendent of the Naval Academy with equal kindness loaned him the many models of the men of war of earlier days from the Department of Seamanship of that institution. With these models, which included a specimen of nearly every class of fighting ships in use for nearly two centuries, was placed the torpedo boat of the U.S.S. Texas, with its torpedo in place.

It was the general opinion that no such complete exhibit of the science of ship-building as applied to men of war was ever made before. Half of the space was taken up by this and the remaining half was assigned to Ordnance.

In the exhibit of Ordnance the same system was followed as in that of ship-building. Real guns with their projectiles of each period showed the armaments that were carried by the men of war of the corresponding dates. By reason of the difficulties of handling, it was impossible to show specimens of the heaviest guns of the present day, but the Chief of the Bureau of Ordnance kindly loaned a V-inch rapid-firing and a VI-inch rapid-firing, which were sufficient to show the high power breech loading cannon of the present day. In the Ordnance exhibit was placed a collection of pikes, cutlasses, muskets and pistols gathered from different sources.

The wall space of the section was so taken up with windows as to leave but little room between them. Therefore large paintings of modern ships executed by a skilful artist were placed there.

With the assistance of Professor Gardner from the U.S.Naval Observatory a complete time-ball outfit was purchased

and installed. The ball was placed on a pole on the roof of the building, visible from every part of the grounds and dropped at Washington mean noon of each day. The dropping apparatus was placed in a glass case on a handsome table on the floor of the building, so that the method of working could readily be seen and understood by the spectators.

In the cupola at the top of the building was placed a powerful search light kindly loaned by the Bureau of Equipment, the Exposition Company furnishing the necessary current for its display, free of charge.

The exhibit was in place and ready for spectators on the opening day of the Exposition, September 18, 1895, and the first week in February, 1896, everything was returned to the various navy yards, etc, from whence they had come.

C.J.TRAIN, Commander, U.S.Navy,
Representative, Navy Department

REPORT OF THE REPRESENTATIVE
# of the
Treasury Department.

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Of the amount appropriated by Congress for exhibition purposes only ten thousand dollars was allotted to the Treasury. The total inadequacy of so small an amount to properly exhibit the administrative functions of this great Department was at once made manifest, when the estimates submitted by the heads of the several bureaus aggregated more than double the amount available.

Repeated efforts were made to distribute the amount allotted to the Department among the various bureaus in such a manner as measurably to satisfy the requirements of each, but finding this impossible a radical departure from established precedents was determined upon, and each bureau was advised that no separate allotment of funds would be made and each was requested to furnish a list of articles proposed to be exhibited with the distinct understanding that the exhibit of the Department would be made as a whole rather than by separate and distinct parts representing each division or bureau. The gratifying success of this scheme of exhibition was largely due to the hearty cooperation of all the exhibiting bureaus and the disposition manifested at all times by each of them to sub-

ordinate the individual display to the success of the whole Departmental exhibit.

The entire management of the display being thus concentrated in one executive enabled the business part of the exhibition to be transacted without friction and with greater despatch than had been possible in former occasions of like character, and I am much gratified to be able to report that the entire exhibit was taken to Atlanta and returned to its proper place in the Department without delay or breakage of any sort, and that within sixty days from the close of the Exposition the entire business in so far as it related to this Department had been finally and satisfactorily closed.

As before stated the amount of funds allotted to this Department being entirely too small to make a proper exhibit, I entered into correspondence with the Exposition authorities with a view of securing their cooperation in the matter of an exhibit of the Life Saving Service which had proven so attractive a feature at the World's Fair in Chicago.

The Exposition management with great liberality at once agreed to erect a Life Saving Station on the lake at a cost of $3,000, and to furnish subsistence for an officer and crew of seven men during the continuance of the Exposition. In order to secure an exhibit from the Mint the Exposition authorities, also, agreed to furnish the motive power to operate a coin press and to provide subsistence for a press-man and one helper.

The practical effect of this arrangement was to double the funds available for the exhibit of the Treasury Department and by utilizing the material which had been prepared for the World's Fair, the Department was enabled to make a very creditable display along the same lines as at Chicago.

The distinctively exhibiting bureaus of the Department were as follows:

The Life Saving Service,
The Light House Board,
The Coast and Geodetic Survey,
The Marine Hospital Service,
The Supervising Architect's Office,
The Bureau of the Mint,
The Bureau of Engraving and Printing,
The Register of the Treasury,
The Internal Revenue Bureau,
The Bureau of Statistics and
The Secretary's Office.

The exhibit of the Life Saving Service consisted in a completely equipped Life Saving Station manned by a crew of eight men. The station, which, as stated above, was erected by the Exposition management, was advantageously located on the lake front and was complete in all its appointments. The crew gave daily exhibitions and boat drills under the direction of Lieutenant C. H. McLellan of the Revenue Marine Service, which

were witnessed by large and appreciative crowds.

The Light House Board furnished an interesting exhibit consisting of one large and one small lens with the necessary machinery to keep them in operation; a large fog-bell with striking apparatus; elaborate models of the Minots Ledge and Fowy Rocks light houses; smaller models of light ships, and light houses, a full assortment of lamps, charts, buoys, maps and other light house apparatus and a large collection of oil paintings and engravings of the most noted light houses, all of which are carefully mounted and tastefully displayed under the efficient management of Mr. Jacob Jose of the Light House Board. Upon the opening of the Exposition the Light House Board detailed a keeper for attendance upon the exhibit to keep the same in good condition and explain the workings of the several exhibits to the public.

After consultation with the Superintendent of the Coast and Geodetic Survey and with his full approbation it was decided to limit the exhibit from that Bureau to a display of the Standard Weights and Measures of the United States, a full set of which were shown, forming a most interesting and attractive exhibit.

After full correspondence with the Supervising Surgeon General of the Marine Hospital Service it was finally decided with much regret to omit that Bureau altogether from participation in the Exhibition. This decision was made necessary in part by the meagre appropriation at the disposal of the

Department and the expensive character of the exhibit if made, and in part to the very limited floor space in the Exposition building allotted to the Treasury exhibit.

The Supervising Architect's Office exhibited perspectives of the more noted public buildings of the country, which, together with the portraits of the former Secretaries of the Treasury, were distributed throughout the exhibit in such a manner as to utilize the wall spaces and greatly add to the finish and completeness of the entire exhibit.

The Bureau of Statistics furnished an elaborate set of charts, made expressly with the view of showing the growth and products of the Southern States, and the striking and artistic manner in which the charts were prepared attracted much favorable attention.

The Internal Revenue Bureau furnished a full set of Revenue stamps, both obsolete and current, handsomely mounted in ornamental frames, the same as shown at the World's Fair.

The exhibit from the Bureau of the Mint, the Bureau of Engraving and Printing and the Register's Office being similar in character were advantageously grouped together in the most conspicuous part of the Treasury space and proved to be the most interesting of the entire exhibit, judging from the crowds constantly in attendance.

The money exhibit was in all essential particulars similar to that shown at Chicago, the Mint Bureau supplying a coin press which was kept in constant operation; a full set

of National Medals and a valuable collection of coins of this and other countries. The Bureau of Engraving and Printing sent their massive frames filled with samples of Government securities of all kinds, showing the process of manufacturing from the destruction paper to the completed note or bond, and also a handsome collection of eminent men of the country; while the Register's Office, beginning where the Bureau of Engraving and Printing left off, exhibited money and bonds in the various stages of use up to the period of its final destruction. All of these exhibits were arranged so that the visitor could follow the entire process of manufacturing, use and destruction, step by step, and, as before stated, this feature of the exhibit seemed to attract universal attention.

Twenty thousand official souvenir medals were struck on the coin press during the progress of the Exposition and turned over to the Exposition company for sale, which in a measure compensated them for the outlay made in the interest of the Life Saving Exhibit.

The following officials of the Department from time to time assisted the Representative in the preparation, installation and maintenance of the exhibit: Mr.S.L.Lupton, Assistant Chief of the Division of Public Moneys; Mr.S.M.Gaines, Chief of the Mail and Files Division; Mr.John B.Clark, Chief of the Inspection and Material Division, Supervising Architect's Office; Mr. Montgomery Cumming, of the Life Saving Establishment; Mr.H.R.P.Holt, of the Chief Clerk's Office; Mr.Thomas Holcomb,

Auditor for the State and other Departments; and Mr. Louis A. Fischer, of the Coast and Geodetic Survey.

CHARLES E. KEMPER,
Representative, Treasury Department.

Auditor for the State and other Departments; and Mr.Louis A. Fischer, of the Coast and Geodetic Survey.

CHARLES N. KEMPER,

Representative, Treasury Department.

REPORT OF THE REPRESENTATIVE
of the
Department of Justice.

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The Department of Justice, dealing with matters of law and the courts, has always found it difficult to provide material for exhibits like the Atlanta Exposition, and the judgment and zeal of its representatives have usually been tested in selecting and arranging even a scant display of objects of interest. The present Representative relied, as did his predecessors on similar occasions, upon the collection of portraits of the Attorneys-General as the chief attraction, and most of the wall space was devoted to these pictures. The originals having been men of celebrity and national reputation, their portraits never fail to attract the interest and attention of visitors from all sections. The exhibit included also an engraved portrait of John Marshall, Chief Justice of the United States (1832), and photographs of prominent Justices and Judges in the United States courts.

As the Department has the supervision of United States prisoners and prisons, they were made the subject of an interesting exhibit. Most of the federal prisoners being confined in the prisons of the several states, it was necessary to call on the wardens of these institutions for photographs and arti-

cles illustrative of the treatment, daily life and employment of the convicts. The response from these officials was generous, and it was possible, through their cooperation,to gather a large number of interesting pictures of prison life in the leading institutions of the country, collections of articles illustrating modes of labor, such as the manufacture of pearl buttons, brushes, etc, as well as several interesting objects made by individual prisoners during hours of leisure and idleness, some of them denoting wonderful skill and talent.

The collection of rare and valuable books, ancient treatises on law and crimes, which was gathered from various sources, afforded an interesting study to visitors. In addition to these were the Opinions of Attorneys-General, 20 volumes; Supreme Court Reports from 1790 to 1894, 158 volumes and digest; and Reports of Attorneys-General from 1870 to 1895.

A contract was made with a responsible and well equipped firm to pack and ship the entire exhibit to Atlanta, install it at the Government Building, and to repack, reship and replace it at the close of the Exposition. The plan worked admirably and without the least confusion, delay or loss. All borrowed articles were promptly returned to the owners, as soon as the Exposition closed.

I believe that the Department exhibit of 1895 was equal in point of interest , and nearly, if not quite, in extent, to any which have preceded it. The entire cost was less than $2500.

FRANK STRONG,

Representative, Department of Justice.

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REPORT OF THE REPRESENTATIVE
# of the
Department of the Interior.

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The exhibits of the Department of the Interior occupied the northeastern corner of the Government Building. A space of about 6600 square feet was assigned to them, of which 2100 approximately were devoted to aisles; leaving 4500 square feet available for exhibition purposes. On the western side a partition, 12 feet high, separated the space from that of the Department of Agriculture, and this wall was continued 20 feet along the northern line, dividing it from the area given to the exhibits of the Navy. The remainder of the wall space, on the northern and eastern sides of the exhibit, was mainly occupied by windows, and in these, forming an almost continuous line of glass, the photographic transparencies of the Geological Survey were displayed. Upon these the Department chiefly depended for the general decoration of the space, and the effect was most satisfactory. The partition and walls, up to a height of 12 feet, were painted a dull brownish red, with a black cornice moulding at the top. Above this, the walls of the building were covered with tightly stretched canvas, tinted a pale pearl gray, with a narrow frieze of red just below the roof. This scheme of coloring gave an admirable

background for wall exhibits, and made a most excellent finish for the display, considered in its entirety. The general effect was that of a room, approximately 80 feet square, with windows on two sides; in which the exhibits of the Department, while so classified as to preserve the individuality of the several bureaus, were so arranged as to preserve an essential unity of design and purpose. A small room, in a projection of the building to the right of the space served for office purposes, and for the same uses a gallery over the eastern entrance was also available. In this latter the Department of Agriculture and the Smithsonian Institution also found office accommodations.

Apart from a large map of Georgia, made for the occasion and displayed by the General Land Office, the exhibits of the Department were confined to four bureaus, namely; the Patent Office, the U. S. Geological Survey, the Bureau of Education, and the Bureau of Indian Affairs. The following are the separate reports of these bureaus:

THE PATENT OFFICE EXHIBIT.

On October 11, 1894, the Commissioner of Patents issued the following order:

"Washington, October 11, 1894.

Order No. 1017.

"Samuel T. Fisher, Assistant Commissioner, John H. Brickenstein, and Arthur P. Greeley, Primary Examiners, James T. Newton, Chief Clerk, and Richard C. Gill, Machinist, are hereby constituted a board for the purpose of supervising, under the direction of the Commissioner, all matters connected with

the exhibit to be made by the Patent Office at The Cotton States and International Exposition, to be held at Atlanta, Georgia, in 1895, in conformity with the provisions of the Act of Congress approved August 18, 1894, for such exhibit.

John S. Seymour,
Commissioner."

In accordance with the provisions of this order, and immediately upon its promulgation, the committee set to work making selections of such models then on file in the Patent Office as would best illustrate the development of the various arts, especially those arts in which the people of the South were particularly interested. The committee selected about one thousand models, and after having received from the architect of the government building a plan of the space to be occupied by the Patent Office exhibit, agreed upon plans for the cases in which the models were to be placed, and the arrangement of the cases in the space which was allotted.

The committee thoughtit wise to depart from the plan previously followed of having cases of uniform construction and appearance, and so made arrangements to construct their cases of various patterns and sizes to relieve the monotonous appearance of the exhibt as a whole. These cases, made of wood in imitation of mahogany, after they were placed in position fully met by their neat and attractive appearance the expectations of the committee in accomplishing the object above mentioned.

Since practically no models had been received by the office for many years, the committee found that some of the

new arts were not properly represented in the exhibit, and it was thought best, therefore, to ask manufacturers for private exhibits of bicycles, cash registers, carbon dyes, cotton presses, and exhibits of material dyed with coal tar dyes, with samples of the dyes. These dyes dissolved in water in large glass bottles and placed in a case in the center of the exhibit, added much to its general appearance by relieving the monotony of an exhibition otherwise made up of models.

The cases were set up and the models arranged therein under the supervision of Messrs. Newton and Greeley, members of the above mentioned committee, and the exhibit was completed when the Exposition was opened September 18, 1895.

The models were arranged in the cases in chronological order, and illustrated in a striking manner the development and improvements in the various arts represented, from their inception to the present time.

In addition to the main Patent Office exhibit in the government building, there were two smaller exhibits from that bureau, one consisting of inventions made by women, which was placed in the Woman's Building of the Exposition, and another of negro inventions, placed in the Negro Building.

Mr. Newton remained in charge of these exhibits until relieved October 17, by Mr. Megrath, a law clerk of the Patent Office; he in turn was relieved by Mr. Campbell, a principal examiner, he by Mr. Brickenstein, a member of the above committee, and he by Mr. Dorman, an assistant examiner.

The exhibit at the close of the Exposition was taken down, repacked in the boxes in which it was sent to Atlanta, and returned to the Patent Office under the supervision of Mr. Malcolm Seaton, a principal examiner of the office. Since the exhibit has been returned to the Patent Office, the same cases used in Atlanta have been put up in the Model Hall in place of the unsightly cases formerly stationed there, and present, with the models arranged therein very much as they were at the Exposition, a handsome appearance.

S. T. FISHER,

Chairman, Patent Office Committee.

THE U. S. BUREAU OF EDUCATION.

As a preliminary step in the preparation of the exhibit of this Bureau, a committee was appointed to draft plans for the same. The Commissioner, Doctor W. T. Harris, directed the labors of this committee, which was composed of the Chief Clerk, Mr. Lovick Pierce, Messrs. L. R. Klemm, Henderson Presnell, and myself. Tentative schemes were presented by Dr. Klemm and by myself, and general discussions were had as to the proper material to be exhibited, the methods of displaying the same, and such kindred subjects as were suggested by the necessities of the case.

The actual preparation of the exhibit fell to my lot, though I was aided by the other gentlemen of the committee whenever their assistance was necessary; and the cooperation of the Chief Clerk was always heartily given.

As much of the work as it was possible to do in Washington was done before the shipment of the material to Atlanta. Comparatively little remained to be done there, and there was little difficulty in completing the work of the installation before the opening of the Exposition.

The primary function of this Office is to collect statistics and facts showing the condition and progress of education in the several States and Territories, and to diffuse such information reppecting the organization and management of schools and school systems, and methods of teaching,

as shall aid the people of the United States in the establishment and maintenance of efficient school systems, and otherwise promote the cause of education throughout the country. Its only executive duties consist in the management of the schools of Alaska and in the supervision of the expenditure of the money appropriated to agricultural and mechanical colleges under the Act of August 30, 1890.

An exhibit, therefore, which displays the operations of representative educational institutions is not only an illustration, but is also an exercise, of the main function of the Bureau. This idea prevailed in the preparation of the exhibit of the Bureau at New Orleans in 1885, and the educational department of the Exposition was managed by the agents of this Office.

The propriety and practicability of doing this for the Atlanta Exposition was suggested and advocated, both in the committee and by Honorable William J. Northern, the head of the Department of Education of the Exposition. But in view of the fact that the school year was then drawing to a close, making it doubtful whether the time remaining was sufficient to prepare a satisfactory exhibit of this character, it was decided to show only the Bureau's own characteristic work, methods, and publications, with such additional material of a general character as was then in hand or readily accessible. The limited amount of money available was also a consideration in reaching this conclusion.

In gathering the material it was fully realized that the things most important from the standpoint of educational values are not necessarily most attractive as exhibition material; but it was the aim to make the exhibit sufficiently dignified and substantial to be worthy of the attention of students, and at the same time to make it of such character as to attract the general public.

The work of the Bureau in diffusing information was made the central feature of the exhibit on its substantial side. This consisted of (1st) its publications, which were shown in bound volumes; (2nd) a collection of statistical charts setting forth the condition of education in its various phases in the United States; (3rd) charts showing the state of education of various foreign countries; (4th) maps showing the distribution of educational institutions in the United States; (5th) a map showing the percentage of illiteracy in the several States; (6th) a large wall-chart showing statistically the progress of education in the South during the last twenty years.

The anomalous condition of the Bureau as a Government Office charged with the collection of statistics and similar information, but without the power to require reports, or funds with which to pay for them, demanded that some means be employed to show how the required data are obtained. Accordingly the exhibit included a collection of manuscript returns which were voluntarily forwarded by the correspondents of the Office. These were bound in twenty-four thick volumes,

which contained about thirteen thousand returns received in a single year from an equally great number of correspondents. When it is remembered that this tremendous mass of statistical information is obtained without cost, this portion of the exhibit becomes an excellent object lesson of the recognition by school men of the usefulness of the Bureau and of the value of its work in relation to their own.

As examples of other sources from which data are obtained there were shown: (1) a collection of foreign school reports, embracing all civilized countries; (2) a number of American educational periodicals, nearly all the States of the Union being represented; (3) an extensive collection of reports of State and city school officers, and of catalogues of all classes of institutions represented in the Reports of the Office. Documents of the last class are characteristic of American education. They form one of the most valuable means of disseminating educational intelligence and of making the ideas and achievements of one institution the common property of all. They are freely and constantly used in the work of the Bureau of Education, and it was fitting that they should occupy an important place in the exhibit.

Education in Alaska presented the opportunity of making one of the most attractive features of the Bureau's display. The conditions of life in that Territory are so entirely different from the conditions that prevail in this part of the country, that it was thought proper to make a display of

characteristic Alaskan articles, in order to show under what disadvantages educational work in that territory is maintained. This portion of the exhibit was very largely the work of Dr. Sheldon Jackson, the General Agent of Education in Alaska.

A few articles were shown which were intended to give an idea of the habits and customs of the natives. These included totem poles, articles of apparel, instruments for preparing skins for use, dishes and utensils, masks used in their dances, models of canoes, carvings from ivory and horn, baskets, hats, etc., made from grass and bark. These were supplemented by a number of photographs showing groups of natives in their characteristic costume, snow-houses, dog-sleds, the manner of disposition of their dead -- it could scarcely be called "burial" -- and of typical Alaskan scenery. There were also a number of drawings by natives representing various scenes common in their experience, such as games, dances, fishing, walrus-hunting, seal-clubbing, etc.

The flora of Alaska was shown in a number of water color paintings which were kindly loaned by Miss E. Leslie Jackson, the artist. Miss Jackson was at one time connected with one of the schools at Sitka, and it was during her residence there that the paintings were made.

The schools themselves and their work were represented by Statistics, specimens of school work, photographs of buildings, of pupils, before and after attendance, of typical civilized and uncivilized families, etc.

The current agitation in favor of improved school desks and the widespread demand for complete adjustability led to the exhibition of a series of models of desks that were in the possession of the Bureau, supplemented by a number of models of similar kind exhibited in the Bureau's space at our instance by the U. S. Patent Office.

These were selected with a view to show typical specimens of desks at different periods of progress, beginning with the primitive puncheon bench and ending with the latest patent adjustable desks. Labels were carefully prepared showing the peculiarity of each desk, with mention of those features in which progress was indicated over desks previously made.

In the bay-window at one end of the space allotted to this Office were displayed a large collection of photographs, illustrating typical educational institutions of the United States. There were represented public schools, academies for boys, seminaries for girls, normal schools, schools for the deaf, schools for the colored race, medical schools, schools of technology, agricultural and mechanical colleges, colleges for women, and colleges and universities.

The photographs were selected to show as far as possible for each institution: (1st) material equipment, including buildings and grounds, laboratories, apparatus, etc.; (2nd) professors and teachers; (3rd) groups of students or pupils; (4th) work of pupils; (5th)social life and games.

These photographs were arranged in wall cabinets by classes of institutions; under each class the arrangement was alphabetical.

As a means of adding to the attractiveness of the exhibit, as well as for its historical and pedagogical value, a series of pictures were prepared and exhibited , illustrating various forms of school punishment. This idea originated with the Commissioner. In its execution, Mr. Felix E. Mahony was detailed from the Pension Office and a room was furnished as a studio for him in the building of the Geological Survey. Twenty water color drawings were made illustrating nearly all the varieties of punishment capable of illustration which were found in the course of an extensive investigation. The pictures were neatly framed and attracted wide attention.

In regard to methods of display a few words may be said. Some of the furniture used had previously seen service at the World's Fair in 1893, but it was all renovated, and much of it was remodeled to suit the special need of this case.

One tall exhibition case, largely of glass, was fitted with shelves and used as a book case; another of similar style was utilized to exhibit the models of school desks, and answered the purpose admirably. Three small book cases of ordinary library style were purchased ready made for bound volumes; they were set against the wall and were as neat as any that would have been specially designed. Statistical charts and many of the photographs were displayed in "wing-

frames", some of which were hung about circular pillars and some on an upright frame above a heavy table that differed but little from ordinary patterns. The frames themselves were of the "single-frame" variety. In each there were two sheets of glass, between which charts were placed, one facing each way; all were held in the frame by means of beads. They are more troublesome to mount than the double frames formerly used, but they are lighter, neater, and cheaper.

There was not sufficient wall space to display the framed pictures, and the need was supplied with two screens ten feet long by seven and one-half feet high. The frames were neatly made of polished oak, the body of the screens being made of matched pine covered with dark red felt. One end was fastened to the wall while the other was securely braced with heavy irons. The upright portions of the braces were made to fit exactly the inside of the posts and the horizontal portions were mortised into the floor, so that the means of support were not visible. All the punishment pictures and the water colors of Alaskan flowers were thus hung, and what threatened to be a troublesome problem was satisfactorily solved.

A case designed for the maps was fitted with large spring rollers on which the maps were rolled singly when not in use. There were two such cases, each holding four maps.

A large number of photographs were exhibited in wall cases similar to those first used in the New Jersey school exhibit

hibit at the World's Fair. They consisted of a series of fifteen light frames, each holding a heavy sheet of cardboard, swung in a compact cabinet with a glass door. The photographs were mounted on the cardboard with ordinary paper fasteners. Cabinets of this kind are, in my experience, by far the best means for displaying such material, and they were admirably suited to our purposes.

For the small curios from Alaska a show case of the so-called "monitor" pattern was built, the taller central portion being used for small totem poles and the lower portion at the ends being filled with smaller articles.

The ornamental effects were secured by the use of (1) portraits of former Commissioners, on the walls; (2) small groups of statuary representing school scenes, on the low book cases; (3) peculiar baskets of Alaskan fashion on the higher cases; and (4) globes and telescopes on the pillows of the wing-frames.

The colored transparencies of southern scenery in the windows formed a part of the exhibit of the Geological Survey, but added greatly to the attractiveness of our own.

JAMES C. BOYKIN,

Agent, Bureau of Education.

THE BUREAU OF INDIAN AFFAIRS.

The small amount allowed for the expense of the exhibit of the Indian Bureau at Atlanta made it necessary to restrict the exhibit to the presentation of the educational side of the work of the Government among Indians. Owing to limited space assigned that Bureau in the exhibition building, the exhibit was again restricted to the work of the school rooms, sewing rooms and shops, omitting any presentation of methods and results of Indian school training in other domestic lines and in farming.

Over fifty Government Indian schools in eighteen states and territories were asked to furnish specimens of schoolroom and industrial work which would give a fair idea of the training afforded in the school and the proficiency of the pupils. Most of them responded with creditable material.

In the exhibit were represented sixteen of the nonreservation training schools, viz:

Albuquerque, N. M.
Carlisle, Pa.
Chemawa, Ore.
Cherokee, N. C.
Chilocco, Okla.
Carson City, Nev.
Ft. Lapwai, Idaho.
Ft. Shaw, Mont.
Ft. Mojave, Ariz.
Ft. Totten, N. Dak.
Grand Junction, Colo.
Keam's Canon, Ariz.
Haskell Institute, Kans.
Phoenix, Ariz.
Perris, Cal.
Santa Fe, N. Mex.

Also twelve reservation boarding schools, viz:

Kiowa & Comanche reservation, Okla. (three schools).
Klamath, Ore.
Puyallup, Wash.
Sac & Fox, Okla.

San Carlos, Ariz.
Navajo, Ariz.
Ouray, Utah.
Standing Rock, N. Dak. (two schools).

Also several day schools on the Pine Ridge and Rosebud reservations, South Dakota, and two mission boarding schools in Oklahoma.

The schoolroom work consisted of papers representing all grades from kindergarten to algebra, together with well-drawn maps and free-hand drawings, clay modeling and relief maps.

The sewing rooms sent all sorts of needlework, from patching and darning and neatly made (and sometimes elaborately trimmed) underclothing to finely finished uniforms for men from the tailor shops and cloth suits for ladies, not omitting crocheting, knitting, drawn work and embroidery, and a pair of diminutive Navajo blankets. Samples of "real" pillow lace from her lace-making schools among the Chippewas were added by Miss Sybil Carter.

The school shops furnished harness, bridles and shoes, tinware and specimens of joiner, blacksmith and wagon work; among them well made cabinets, a miniature harrow and road scraper and a model of a ship.

The schoolroom work mounted on cards 28" by 22" was displayed in four oak wall cases, each of which contained 14 swinging frames unglazed, holding two cards each; also in a column wing frame which had 20 glazed swinging frames in two tiers.

The specimens of industrial work were arranged in four oak cases 9 1/2 ft. x 8 ft. x 4 ft. The cases themselves being made at the Carlisle school shops, were a noteworthy part of its own exhibit.

The Indian Bureau exhibit was given a floor space of only 20 x 32 feet, adjoining the Educational Bureau, and it had a wall space of 50 x 11 feet.

The floor space was mainly occupied by the four large cases. The wall space was filled as follows: under the window the school exhibit from Haskell Institute, then a cherry cabinet made at Carlisle, the wing-column, a fine piece of furniture made of red wood from Phoenix and a lounge made at Albuquerque. Turning the corner were the four cases of schoolroom work, two on each side of a glazed center space which was filled with some superior specimens of work and the Chippewa lace exhibit.

For the decorative effect a dado made of Chippewa mats filled the space below these cases, and above were hung the photographs of Indian school buildings and pupils with work from the art department of the Carlisle school in charcoal and oil and water color. Navajo blankets hung on the upper part of the partition and were spread over the lounge. On each corner of the cases stood pieces of Pueblo pottery, while high over all hung a birch bark canoe. The window space was filled with the transparencies of prominent Indians and scenes from Indian life, furnished by the Geological Survey. Over the archway leading to the Agricultural Department

there hung a number of photographs of educated Indians and the Carlisle banner with its motto "Into Civilization and Citizenship" had its place over the wing-frame.

By far the most complete and comprehensive of the individual exhibits was that of the Carlisle school, whose system of industrial training is well known and has served as an example to many institutions throughout the country.

The exhibit as a whole marks a new epoch in Indian affairs -- when the results of the educational efforts for this greatly misunderstood people become of sufficient magnitude and interest to justify the position given them. That the place has been fairly won, a knowledge of this exhibit amply proves.

A. J. STANDING,

Assistant Superintendent, Carlisle School.

THE U. S. GEOLOGICAL SURVEY.

The exhibits of the U. S. Geological Survey, were divided into two distinct portions; one of these, the general display, was in the Government Building, in the direct personal charge of the Representative; the other, economic in its character, was organized by Dr. D. T. Day in the building devoted to Minerals and Forestry. A separate report concerning the latter is appended.

The general exhibit of the Survey occupied a floor space of about 1800 square feet, and displayed the usual activities of the Bureau. A large exhibit of maps, mainly of southern localities, covered the available wall space, which was 10 feet in height and nearly 50 feet long. In addition, the windows were filled with a collection of 72 photographic transparencies, made in the Survey laboratory by Mr. J. K. Hillers; of these, 12 related to Indian subjects, and were shown in connection with the Indian exhibit. The other, of which 30 were colored, represented geological scenery, with particular reference to the Southern States. In order to obtain the latter series, Mr. Hillers made two extended trips through the South, visiting points in North Carolina, Tennessee, Georgia, and Florida, taking negatives at all noteworthy points. In Georgia especially, the views of Stome Mountain, Kenesaw, Tallulah Falls and Toccoa Falls were most characteristic.

In the foreground of the exhibit, facing a main aisle

of the building, a collection of relief maps and geologic models was displayed. Of these, one only was new; a relief map showing the region from Atlanta to Chattanooga inclusive, and from a point perhaps 20 miles east of Atlanta to another westward of Anniston. This map, in moderate, not high, relief, gave a most excellent notion of the topography of that area. It may be regarded as one of the most successful models yet made under the auspices of the Survey.

In the center of the exhibit, were placed two large relief models of the United States, made with the proper curvature as segments of a globe. One was topographic only, the other showed the ice sheet of the Glacial Period, and so brought out an essential difference between the northern and southern portions of our country. These models were made by Mr. E. E. Howell, under the supervision of officers of the Survey.

The geological features of the exhibit strictly speaking, were necessarily limited in extent, and filled only seven double Liverpool cases. Two cases contained southern minerals, two a collection representing the Yellowstone National Park, two a general collection of fossils, and the seventh an educational series of rocks. The specimens, however, were all carefully selected; so that the exhibit, though small, was exceptionally choice in quality. It represented especially the scientific side of our work, leaving the practical phases of geology to the department of mines and mining. In

this way duplication was avoided, and the different interests of the Survey received proper attention.

One more exhibit of the Geological Survey remains to be noticed, and this was the novelty of the occasion. Heretofore the Bureau has made only *quiet* displays, as distinguished from *active* exhibits. In this case a full sized lithographic press kindly loaned by R. Hoe and Company, was shown in full operation, exactly as in that printing establishment of the Survey in Washington. On this press, which was in charge of Mr. R. O. Otterback, the Atlanta sheet of our topographic maps was printed, for free distribution to visitors. On the back of the maps a description of the aims and work of the Survey was placed, in sufficient detail to give the reader a fair notion of the purposes which the organization is seeking to carry out.

A display like that of the Survey is necessarily in some sense a sort of special museum. A modern museum has been aptly defined, by one of the foremost of living experts, as "a collection of labels illustrated by specimens." From this point of view the exhibit was thoroughly labelled, and in that way its educational value was assured. It received much attention from schools and teachers, and left, I believe, in the minds of visitors a much clearer idea of the work which is in progress, and a higher appreciation of its value. A government exhibit gnnerates an intelligent respect for the

Government work, and so, educating the people, helps to make better citizens.

F. W. CLARKE,

Chemist, U. S. Geological Survey.

THE MINING EXHIBIT.

In August, 1894, the President of the Cotton States and International Exposition Company appealed to the Director of the U. S. Geological Survey for such aid as he could lend in connection with the Exposition. The reply of the Director advocated a general exhibit of the mineral resources of the Appalachian System and the territory to the southwest, including Texas, and he suggested that this exhibit be made so comprehensive as to include the entire Mining Department of the exposition company in its organization, so that the mineral exhibits should make, when taken together, a comprehensive showing of the mineral products of the South, their quantity and quality, the conditions at present governing their production, with as much as possible of their past history, the conditions which now limit the usefulness of the economic minerals, and the geological conditions, so far as these could be shown, under which these minerals are found. It at once became evident that should this plan be adopted the very considerable material which could be obtained in the South and which would undoubtedly be exhibited by private individuals, as well as by the Government, made the chief difficulty lie in the direction of an efficient arrangement which should make it easy for the visitor to see in each group all that the South possessed of any given mineral and also to see as clearly as possible the geographic distribution of each of these minerals.

The simplest plan which could bring about this double arrangement of material was offered by Prof. F. W. Clarke, which was to arrange the minerals according to a system of rectangular co-ordinates, so that on one line would be represented all the minerals of a certain kind, while on a line crossing this at right angles would be the arrangement by States. This plan was adopted with the following modifications presented by Mr. W. A. Raborg. The space was arranged in concentric squares, devoting the outside or the larger squares to minerals requiring the greatest space, and the interior portions to the less bulky kinds. The space was then divided by lines radiating from the center into a number of sections each devoted to a given State, so that by following around the building the minerals of any kind could be inspected together, whereas the visitor interested in the products of a single State could find them in one section.

The work of notifying all the mining operators and owners of mineral properties in the South and enlisting their active cooperation was taken up by a complete system of correspondence, which involved in all some thousands of interested persons. In addition to this the work was divided so as to give to the charge of one person each important industry, and the expert so selected, by personal visitation and continued correspondence, carried on the matter of securing the interest and cooperation of all concerned.

The expenses of the work were borne jointly by the Government and by the Cotton States and International Exposition Company.

The representatives appointed by several of the southern States also rendered valuable assistance in collecting the details of the exhibits of minerals. Thus most of the work of collecting for the State of Georgia was turned over to Prof. W. S. Yeates, State Geologist, and in North Carolina the entire work was borne by Prof. J. A. Holmes, State Geologist. The exhibit from Pennsylvania was collected and exhibited by the State, and service was also rendered by the State officials of Arkansas. The exhibits from other States were collected by representatives of this office, frequently with considerable aid from private corporations.

The Intensity of Southern Mining.

In order that the visitor might obtain a fundamental idea of the relative importance of the various mineral products, a statistical column was erected which showed by the size of a cube of each mineral the total amount of that mineral mined in each minute in the South. These amounts are shown in the following table:

Statistical Column.

	Thickness of cube.	Weight.
Coal	11 ft. 2 in.	50 tons. 1500 lbs.
Iron	4 ft.	7 tons. 470 "
Petroleum	3 ft. 5 in.	305 gals.
Limestone	2 ft. 11 in.	2 tons. 118 lbs.
Phosphate Rock	2 ft. 7 in.	1 " 665 "
Granite	2 ft. 6 in.	1 " 616 "
Cement (hydraulic)	1 ft. 11 in.	4 bbls. 173 "
Sandstone	1 ft. 6 in.	639 "
Salt	1 ft. 5 in.	416 "
Marble	1 ft. 2 in.	281 "
Pyrites	11 in.	258 "
Slate	10 in.	90 "
Mineral Waters	8 in.	3 gals. 1 pt.
Gypsum	7 in.	34 lbs.
Soapstone	7 in.	42 "
Bauxite	7 in.	39 "
Barytes	7 in	53 "
Mineral Paint	6 in.	$39\frac{1}{2}$
Manganese	2 in.	58 "
Corundum	2 in.	1 lb. 2 oz.
Monazite	$1\frac{1}{2}$ in.	1.04 oz.
Copper	1 in.	14 oz.
Mica	7 " 7/10	63 oz.
Silver	5/10	65 oz. (Troy)
Gold	3/10	03 oz. "

The Economic Products of the South.

There can be no greater cause for congratulation than that the fundamental mineral product of the South is the coal upon which industrial advance depends. Considerable effort was, therefore, devoted to making the exhibit of coal a clear illustration of what the South can furnish. This was done by transporting to the building, sections of the principal veins of coal showing the actual thickness of the vein, the quality, the location of slate partings, etc. Most conspicuous among the coal exhibits was a section $11^1/_2$ feet high of the big vein of the Elk Garden coal field in West Virginia, which, though lacking two feet of being the total thickness of the vein, gave the best illustration that has yet been made of this wonderful deposit. The Davis Coal and Coke Company also showed excellent examples of the smithing coals which have proved especially valuable, and of their coke from Thomas, West Virginia.

The exhibits of coal and coke from Kentucky, Tennessee, and Alabama, were also particularly complete and instructive. The coals of Pennsylvania were also shown, and even Arkansas, Georgia and North Carolina gave instructive exhibits of their coal resources by means of sections of veins.

It seems to me that no more efficient method of showing the coal resources has been devised than this, and it is

worth while to record that the considerable expense was cheerfully borne by the producers of coal in mining, packing, and transporting these heavy exhibits to the place of exposition.

The exhibits of iron ore from Tennessee, and particularly from Alabama, were shown by mutual consent principally in the Alabama State building, where by means of greater floor space and the appropriation for State exhibits, greater attention could be paid them.

The exhibits of stone included magnificent specimens of granite, one a slab from Mount Airy, North Carolina, 28 feet long by 10 feet by 1 foot, which though unusually difficult to transport on account of its thinness, was successfully exhibited through the aid of the Mount Airy Granite Company. The most remarkable stone exhibit was the shaft brought from the quarries of Messrs. Venable Bros., at Stone Mountain, Georgia, which by its size, 34 feet by an average of $3^1/_2$ feet square in section, showed not only the ability of these quarries to furnish large pieces of stone, but the ability of the company to transport them to the exposition grounds. It was evident from an inspection of the quarries that pieces several times as large could easily be (and have been) quarried if the facility existed for handling after they were broken out. The stone resources of other States, and particularly the marbles of Tennessee, were shown by columns, usually with rough bases, polished cylindrical portions and carved caps by which the adaptability of the stone to the various structural purposes

could be seen at a glance

By far the most instructive display was that of the products of clay from the Southern States, extending from small exhibits of common brick to high grade art work in terra cotta, the product of the immediate neighborhood of Atlanta. The high quality of fire brick from Killains, South Carolina, from St. Louis, Missouri, and from the neighborhood of Atlanta, was such as to create a profound impression among all the experts in this line who visited the Exposition, while the examples of staff work and terra cotta showed how the clay resources of the immediate neighborhood of Atlanta have attracted sculptors and developed the terra cotta industry to a high degree as compared with any other region of the United States, and from this there has developed the manufacture of plaster staff which the exhibits showed to be fully as good as any other staff products in the United States.

The petroleum resources of the Southern States were shown by the products from Kentucky, Tennessee, Louisiana, and especially from the wells lately developed in Texas.

A collection of the gem resources of the Southern States occupied a position at the intersection of the two main aisles in the center of the building. Without referring to more than the magnificent specimens of emerald, beryl, rough and polished quartz, amethysts, and the collection of pearls, the completeness of the exhibit and the excellence of its character was substantially proved by its immediate purchase

for presentation to the U. S. National Museum. This exhibit was collected by Mr. George F. Kunz, of Tiffany and Company, to whom also credit is due for special exhibits showing the mineralogical associations of the diamond, opal, garnet, and of amber, the various forms of quartz, and a large collection of crude platinum sands.

In order that a visitor might become acquainted with the various aspects under which the prominent mineral products of the world may be found, a representative collection was made as a special departmental exhibit, and assigned to a prominent place near the center of the building. Prominent among the specimens shown were the minerals of copper ranging from the various forms of metallic copper of the Lake Superior region, to the copper and nickel pyrrhotite of Canada, and the carbonate ores of Arizona. The zinc ores of Franklin, New Jersey, and the case furnished by Messrs. George L. English and Co., showing the various forms of "rare earth" minerals which have industrial possibilities were included in this exhibit, and associated with it was also a large collection of the silicified wood in its various natural and polished forms from Chalcedony Park, Arizona, exhibited by the Drake Company, of St. Paul, Minnesota.

It is well to call attention also to the completeness with which the State Geologist of North Carolina showed the conditions under which various minerals occur in that State. Simply as a prominent example should be mentioned the conditions

tions of the occurrence of monazite sand, which was particularly well illustrated by a section from the surface through the overburden of clay and sand to the monazite bed. This industry was also shown by all the steps in its development from the sand to the finished Welsbach incandescent lamps which were used in illumination of the building.

Undeveloped Resources.

In order to show the conditions of occurrence of useful minerals and striking examples of enterprise shown in their development, the windows of the building were used for a series of large transparent photographs illustrating the mines of iron ore and their blast furnaces, the prominent quarries of marble and granite, the phosphate mines, and a series of photographs loaned by the Standard Oil Company, including one 84 inches by 59 inches, showing the occurrence, on a relief map, of petroleum in the United States.

The general plan of the exhibit being to illustrate the economic resources of the Appalachian system, we framed against the ceiling six large geological sections, the first one cutting across the Appalachian mountains at the northern edge of Maryland; the next two across North Carolina; the fourth at the lower end of the series near Chattanooga; the fifth was a section through Birmingham, Alabama; and the sixth showed a complete and separate section devoted to Texas. These sections were painted on oil cloth and made to show not only

the conditions of the general geology, but the location of the principal bodies of ore, granite, marble, coal, etc. In addition to these exhibits in the Mining and Forestry Building proper, the various exhibits in state and railroad buildings were aided as far as possible, particularly in the exhibits of phosphate rock of Florida and elsewhere.

Outlook.

As regards the ultimate results to which it is hoped this exhibit will reach, we must point to the progress which has already developed in increasing the foreign and especially the South American trade with southern coals, to the increased knowledge and confidence which has been given to northern capitalists as regards the fuel supply which can be availed of in establishing industries of all kinds in the South, and which will be nowhere of greater advantage than in stimulating the movement toward the manufacture of cotton where it is produced. The use of processes for the saving of by-products from the southern coals was well illustrated and promises results of next importance to those which have been mentioned above. It seems to the writer, however, that perhaps the greatest value was the endeavor to make the general people of the South familiar with the conditions of occurrence and the appearance of their useful minerals with a view not only to stimulating prospecting, but to giving it far more careful direction.

Besides these objects which were striven for, it has

become manifest that commercial activity in increasing the sales of southern mineral products has already become significant.

Acknowledgments.

It is with great satisfaction that I record the cordial cooperation offered to the Government in this work by the various State officials, particularly Prof.J.A.Holmes, State Geologist of North Carolina, and Mr. H.B.C.Nitze, to whose indefatigable industry the wonderful results from North Carolina are due; Prof.W.S.Yeates, of Georgia; Mr. W.G.Vincenheller, State Commissioner of Arkansas; and the Commissioners of the State of Pennsylvania. Particular acknowledgments are also due to Mr.E.W.Parker, who had entire charge of the collection of the exhibits of coal; to Dr.William C.Day, who acted in a similar capacity for the exhibits of stone; to Mr.Jefferson Middleton, who had entire charge of the organization of the exhibits of clay products; to Mr.John Birkinbine for assistance in collecting the iron ore exhibits, and to Mr.George F. Kunz for the exhibits of precious stones and others referred to above; while especial thanks are due to a number of exhibitors for the cooperative spirit shown in making their displays conform to the general idea of showing the southern mineral resources. Among them conspicuously were Mr. George P.Erhard and Mr.W.F.D.Crane of the H.W.Johns Manufacturing Company, Mr. Geo. S.Barrows and other representatives of the Welsbach Light Company, Mr.E.E.Howell, who prepared the geological sections, Dr. C.W.Hayes, Mr.Arthur Keith, Professor Eugene A.Smith and Mr.

Robert T.Hill, for the manuscript of these geological sections, and to Mr.E.F.Batten, manager for the Drake Company.

DAVID T. DAY,

Geologist.

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COST OF INTERIOR DEPARTMENT EXHIBIT.

The expenses of the whole Department exhibit, roughly classified, were as follows:

The Department in General.

Travel and subsistence	$ 668.30
Labor and service	354.25
Installation expenses	546.36
Storage of packing boxes	174.38
Freight and terminal charges	125.53
Miscellaneous expenses	244.28
Total	$2113.10

The General Land Office.

One map, framed and packed	$ 307.40

The Patent Office.

Travel and subsistence	$1117.02
Labor and services	599.50
Freight and hauling	846.84
Show cases	1834.00
Miscellaneous expenses	640.35
Total	$5037.71

The Bureau of Indian Affairs.

Travel and subsistence	$ 443.79
Labor and services	31.50
Show cases	610.00
Freight and hauling	140.97
Miscellaneous expenses	238.59
Total	$1464.85

The Bureau of Education.

Travel and subsistence	$ 636.91
Labor and services	107.00
Freight and hauling	140.92
Show cases and furniture	500.12
Miscellaneous expenses	676.77
Total	$2061.72

U. S. GEOLOGICAL SURVEY.

Main Exhibit.

Travel and subsistence	$ 584.10
Labor and services	450.64
Freight and hauling	733.28
Show cases	209.55
Photographic transparencies	459.77
New exhibits, models, etc.	1172.50
Map and press exhibit	976.49
Miscellaneous expenses	463.11
Total	$5049.44

The Mining Exhibit.

Travel and subsistence	$1028.67
Labor and services	738.55
Freight and hauling	506.97
Show cases	969.50
Geological models and sections	750.00
Photographic transparencies	1040.00
Miscellaneous expenses	908.65
Total	$5942.34

Total Summation.

Departmental expenses	$ 2113.10
Patent Office	5037.71
Geological Survey	5049.44
Bureau of Education	2061.72
Bureau of Indian Affairs	1464.85
Mining Exhibit	5942.34
General Land Office	307.40
Total	$21976.56

F. W. CLARKE,

Representative, Department of the Interior.

REPORT OF THE REPRESENTATIVE
# of the
Post Office Department.

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The exhibit of the Post Office Department was made, not as a mere show, but in strict conformity with the intention of the law, as a display of articles illustrative of the "function and administrative faculty of the Government" so far as relates to the postal service in times past and present.

The floor space in the building where the display was made, allotted to the Representative of the Post Office Department, was quite small, being less than four percent of the entire amount, or 2,156 square feet out of a total of 58,000. His allotment of money was relatively still smaller, being only $4,000 out of a total appropriation of $150,000, or two and two-thirds percent.

The postal exhibit was, therefore, small. It took up the entire amount of floor space allotted to it, including all the contiguous wall space, but necessarily a great many things were omitted which would have made the exhibit more interesting. On account of this lack of space the Representative of the Post Office Department found it impossible, without useless extravagance, to use up even the small amount of money avail-

able for the exhibit, a little more than $1,500 out of the allotment of $4,000 being turned over by him to be covered into the Treasury.

The most important thing lacking in the exhibit was a model post office. That absolutely necessary feature of the postal service, operating on the best system and with the most approved facilities and methods, must naturally be interesting; for the post office is the one thing controlled by the Government that comes into touch with the interests of everybody in the land. In several previous expositions a working post office has formed part of the exhibit, and has not only been highly interesting as such, but has performed valuable service in the collection and distribution of mail, as a station of the main office in the city where the expositions have been held.

Small as the display was, however, it was a highly creditable one, and attracted much attention.

The growth of the postal service was well illustrated by a display of five old ledgers, kept during the war of the Revolution by the Postmaster General himself, embodying the accounts of about 75 postmasters--all that were needed in the country at that time-- in contrast with a conspicuous statistical chart, showing the postal service of the United States to be now by far the greatest in the world.

The several ways of transporting the mails from place to place were shown by, first, the model of an Indian runner, with dog team, drawing a toboggan over the snow--a method of carrying the mails that is sometimes resorted to in Northern Michigan and other frontier places during midwinter; second, a able for the exhibit, a little more than $1,500 out of the allotment of $4,000 being turned over by him to be covered into the Treasury.

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The several ways of transporting the mails from place to place were shown by, first, the model of an Indian runner, with dog team, drawing a toboggan over the snow--a method of carrying the mails that is sometimes resorted to in Northern Michigan and other frontier places during midwinter; second, a model of a mounted western mail carrier; third, model of a steamboat carrying mails on river routes; fourth, models of ocean mail steamers; fifth, model of a postal car, completely furnished.

The method of delivering mails in cities was shown by the model of a letter carrier completely equipped, and by one of a special delivery messenger mounted on his bicycle.

The means by which the mails are secured during their transit were illustrated by several cases of mail bags and locks formerly and now in use.

The instrumentality by which postages have been and are now paid was strikingly shown in a collection of old letters that had passed through the mails when postage was paid in money, and in a splendid collection of postal cards, stamped envelopes, and postage stamps of all the several series that have been in use from 1847 until now.

Some idea of the process of manufacturing postage stamps was given through a collection of entire sheets thereof, before being gummed, perforated or cut.

There was also a small display of articles showing some of the means by which postal business is carried on--official envelopes and blank forms, postmarking instruments, registry seals, blank commissions of postmasters, etc, and a number of photographs showing post office buildings in the larger cities.

As illustrating some of the dangers attending the carriage of the mails, a picture was exhibited showing the holding up of a stage coach by robbers.

There was quite an interesting display of the portraits of the veterans of the postal service--men who have been in office thirty years and upwards.

Finally, there was an exhibit of articles showing to some extent the manner of doing business by foreign postal administrations, contributed by most of the countries constituting the Universal Postal Union.

The feature of the exhibit which attracted the greatest notice was the Indian with his team of dogs. The next was the collection of postage stamps. But the entire exhibit seemed to give pleasure to the thousands who visited the Government building, and it was no doubt of instructive value besides.

KERR CRAIGE,

Representative, Post Office Department.

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REPORT OF THE REPRESENTATIVE
# of the
Department of Agriculture.

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The exhibit of the Department of Agriculture at the Atlanta Exposition of 1895 was for the most part an entirely new one. The collections exhibited by this Department at the World's Columbian Exposition in 1893 were, in the absence of any suitable place in which to preserve them at the Department in Washington, either deposited in the Field Museum at Chicago, or loaned to scientific and educational institutions which were prepared to care for and use them properly. The Department of Agriculture, unlike some of the other departments, had therefore to collect and arrange an exhibit on a new plan, made up largely from material purchased for the purpose.

The plan adopted proposed, in accordance with the act authorizing the government exhibit, to illustrate some of the more important functions and operations of those bureaus and divisions the work of which seemed likely to be most interesting and instructive to the people of the South and to give them the best general idea of the varied and far-reaching activities of this Department. Owing to the limited money and more limited space allowed, it was only possible to illustrate some of the operations of a few of the leading agencies included in this Department. In short, it was sought to show, by suitable specimens of work, what the Department of Agriculture was doing to

develop the resources of the country, and especially of the South, and to protect the property and advance the general interests of the farmers and other industrial and commercial classes.

This report is divided into two parts. First, a condensed description of the exhibits; and secondly, a brief business statement.

DESCRIPTION OF THE EXHIBIT OF THE DEPARTMENT OF AGRICULTURE.

The main portion of the exhibit of this Department, including everything except the Road Exhibit, which was located on the grounds in the rear of the Government Building, and the Forestry Exhibit, which was installed in a separate building, as will be described below, occupied eight thousand square feet of floor space in the north section of the Government Building. It fronted upon the main east and west aisle and was divided by the main north and south aisle. See plans of the Government Building accompanying this report and the floor plan of the Department of Agriculture exhibit herewith.

The visitor entering at the main door and looking directly in front of him, saw thus on the left the pavilion containing the collective exhibit of cotton products and on the right that of the collective exhibit of fruits. Over the central aisle between these two hung a trophy consisting of an eagle supporting the Department seal, which proclaimed the fact

that "Agriculture is the foundation of manufactures and commerce", a statement the truth of which was at once apparent in the exhibits. Recognizing the realization of its importance to the people, the Department exhibit was collected and arranged in accord

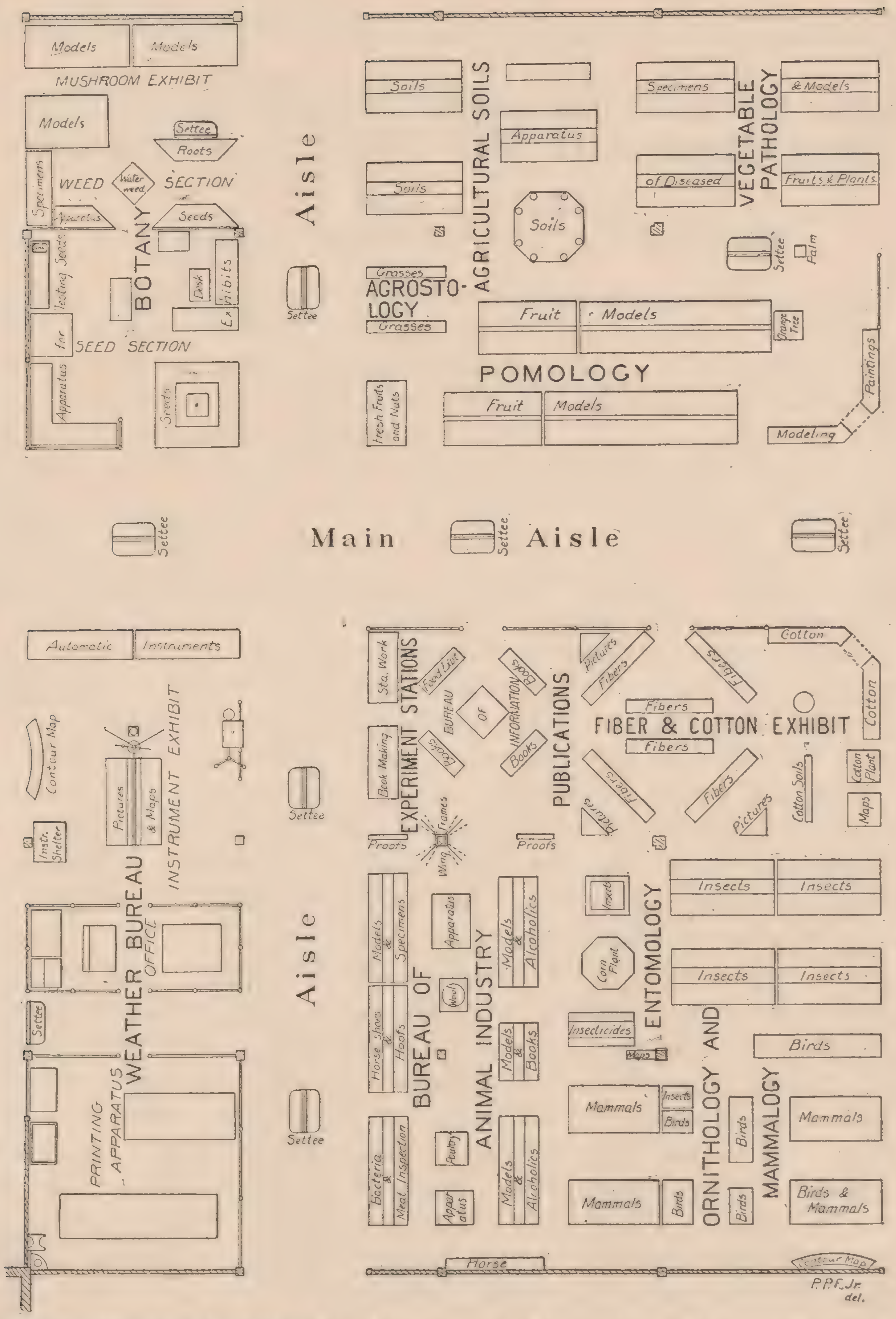

FIG. 129.—Diagram of exhibit of U. S. Department of Agriculture at Atlanta Exposition.

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that "Agriculture is the foundation of manufactures and commerce", a statement the truth of which was at once apparent in the exhibits. Proceeding on a realization of its importance to the people, the Department exhibit was collected and arranged in accordance with the general plan above outlined, with a special view to giving a clear idea of what the Department is, what it has done and what it is doing, for the agricultural interests of the country. It developed the fact that in the performance of the general purposes set forth in the organic act creating it, the scope and character of its work have been from time to time enlarged until they now embrace many subjects not though of when the Department was created, but which scientific research has since shown to be vital to agriculture. For example, the work of the Weather Bureau and of the Division of Agricultural Soils illustrated the methods of studying the climate of both atmosphere and soil in their relation to agriculture and horticulture; the exhibit of the Division of Botany represented a seed-testing laboratory at work; the exhibit of the Division of Pomology contained many models of fruits which have been or might be grown in the South, with illustrations of the Department's methods of studying them; the exhibit of the Division of Vegetable Pathology and Physiology presented some specimen diseases of fruits and plants, with the methods of preventing or curing them; the exhibit of fibers illustrated the commercial fibers which are or should be grown in the South, and their products; the exhibit of the Bureau of Animal Industry showed its work upon the diseases of animals and in the inspection of meat; the exhibit of the Division of Biological Survey illus-

trated the fauna of the South, while the exhibit of the Division of Entomology showed the more important injurious insects found in this section of our country, with the methods of combatting them. The great educational agencies of the Department, the Office of Experiment Stations and the Division of Publications, were illustrated by a few typical specimens of the work of the experiment stations and by books, charts and bulletins issued by the Department.

The following descriptive list gives the chief objects included in these various exhibits.

WEATHER BUREAU.

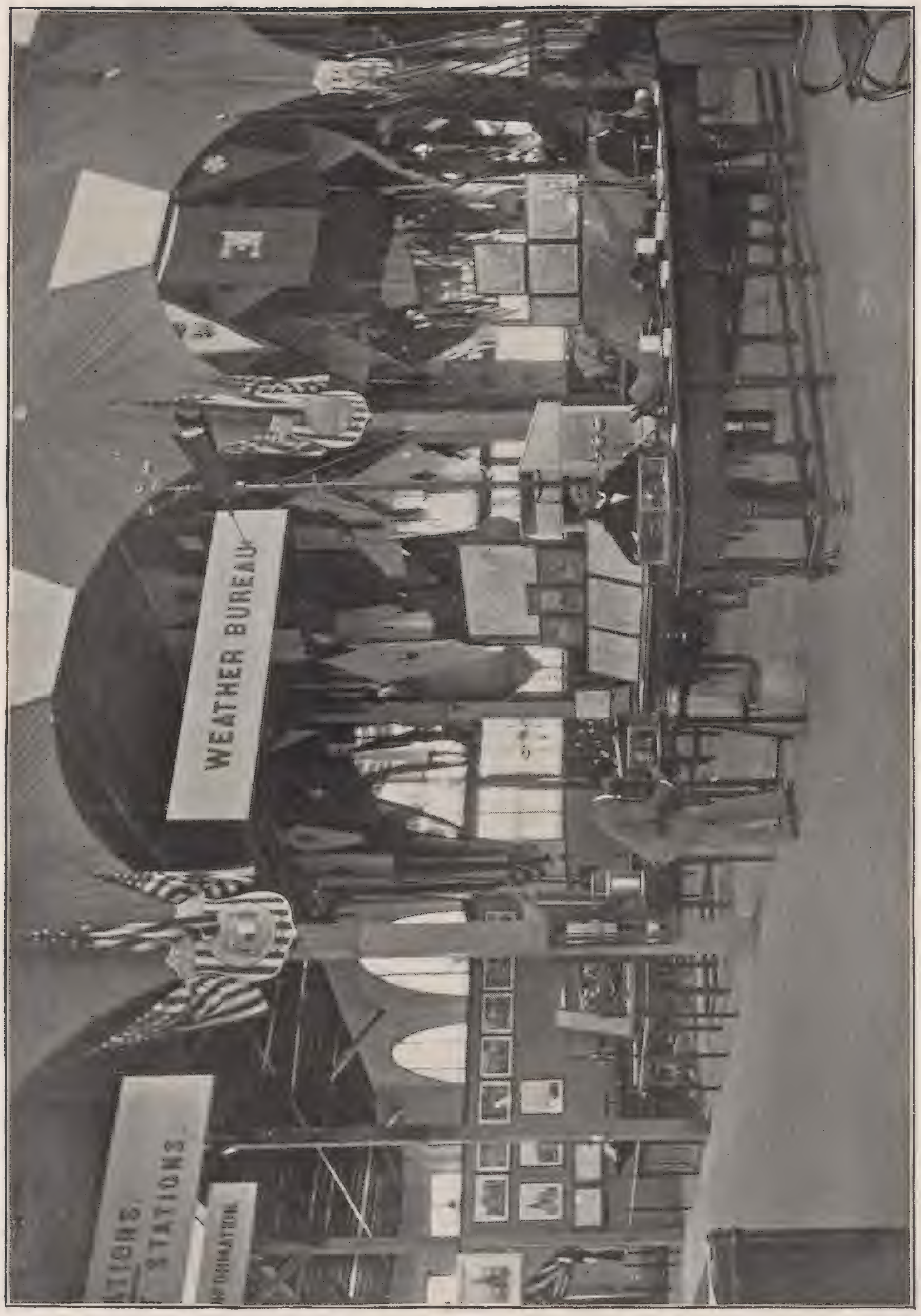
This exhibit was divided into three chief sections, as follows:

A, a completely equipped Weather Bureau station; B, a collection of climatic and meteorological charts, photographs of clouds, lightning, etc, and a full set of the publications of the Bureau, illustrating its educational methods; and C, a model weather forecasting station at work, with a printing office for the daily publication of lithographic weather maps for distribution.

A:- Model Weather Bureau Station.- In this section the following apparatus were exhibited:

Collection of automatic instruments, giving continuous records of the velocity and direction of the wind, the duration of sunshine, the atmospheric temperature and pressure, and the amount of rainfall.

Apparatus exhibiting the action of instruments for recording rainfall by means of weighing rain and snow.



View of Exhibit of U. S. Weather Bureau at Atlanta Exposition.

Devices for exhibiting the pressure of the air and the fundamental principle of the barometer; standard mercurial barometers, and barometers with parts shown in section, and aneroid barometers of different types; compensated steel siphon tube barograph, of great precision, giving continuous record of air pressure.

Standard instrument shelter containing thermometers, psychrometers and thermograph, and exhibiting the standard forms of instruments and the proper methods of exposure for obtaining correct observations; standard rain-guage and box supports.

Combined thermometer and wind vane support for the proper exposure of instruments giving the velocity and direction of the wind; normal air thermometer and comparator, the standard type of thermometer for obtaining correct measures of temperature, and the apparatus employed in comparing thermometers for the purpose of eliminating errors of construction.

B:- A collection of instructional material:-Twelve climatic charts giving normal annual and seasonal temperature, humidity, etc, for the United States.

Collection of bromide prints, enlarged from photographs of clouds, lightning, etc.

Relief map of the United States colored to show the annual rainfall, as compiled from all authentic observations from 1738 to 1891; etc.

C:- Model forecast station at work:- An exhibit in daily operation from about 10 A.M. to 1 P.M., illustrating the methods of charting daily weather observations for the purpose of forecasting weather conditions for the next 36 hours and the publication of daily weather maps.

Every day, except Sunday, between the hours of 10 A.M. and 1 P.M. the printing press was in operation, turning off weather charts showing the weather conditions prevailing over the country at 8 o'clock in the morning and giving a forecast of the weather for Atlanta and its vicinity for the succeeding twenty-four hours. This was a practical illustration of the principal work of the Bureau, to which all its investigations lead.

BUREAU OF ANIMAL INDUSTRY.

The work of this Bureau was illustrated by means of enlarged bromide prints and photographs, and alcoholic specimens relating to the various contagious and infectious diseases, with wax models which not only served to show the changes in conformation resulting from disease processes, but also the color transitions from the normal to the diseased state.

The exhibit contained, for example, a large collection of specimens and models, showing the ravages which tuberculosis makes in the lungs and other organs of cattle. At one time contagious pleuro-pneumonia was quite prevalent in cattle in central and eastern portions of the United States, but owing to the work of the Bureau of Animal Industry in the enforcement of the Federal law concerning it, this dreadful disease has been entirely eradicated. Under this law affected animals were appriased and destroyed, contaminated premises were disinfected, and where this was impossible the buildings were destroyed, and cattle which had been exposed to the contagion were isolated and closely watched. It took five years for the Bureau to effect this, and in 1892 the Secretary of Agriculture issued a

proclamation declaring the United States free from pleuro-pneumonia. Specimens were exhibited showing how this disease affected cattle.

Other diseases were graphically illustrated, among them Texas fever, at present one of the most important cattle diseases in this country, existing mainly in the Southern States. A map of the United States was exhibited, which showed the area permanently affected by this fever. Since it has been found that the disease can be communicated by cattle ticks, it has also been shown that the disease can be prevented by keeping cattle free from ticks. A number of insecticides were shown, by the use of which the small farmer can keep the ticks off his cattle. Another interesting exhibit of the Bureau consisted of specimens and models illustrating infectious swine diseases which are indigenous to this country, the chief of these being hog cholera and swine plague. These two diseases were represented by alcoholic specimens of the intestines of hogs which had succumbed to hog cholera, and by parts of the lungs showing the changes in structure in that organ brought about by the disease process known as swine plague.

Some idea of the general inspection work of the Bureau was given by a bromide print of the inspection room at Chicago, showing 50 or more persons engaged in examining samples of meat from hogs which had been slaughtered for export trade.

The dairy industry was represented by a large number of photographs of milch cows famous as milk and butter producers, and there were also in this collection, of much interest to horsemen, exhibits designed to illustrate the various

diseases and malformations of the horse's foot, as well as to show the proper patterns of shoes to use in such cases.

Among the other chief exhibits of this Bureau were the following:

Some of the more important apparatus used in bacteriological research.

Stuffed specimens of hen and chickens, and alcoholic specimens of the same to illustrate "gape-worm" disease.

Samples of wool grown in the Southern States.

Exhibit of the apparatus used in studying bacterial products. Bacterial products such as mallein, tuberculin, hog-cholera serum, diphtheria toxines, diphtheria anti-toxine. Hog-cholera remedy.

Map of the United States indicating territory permanently infected with the contagion of Texas fever. Jar containing piece of skin of cow having on it a large number of cattle ticks.

Stuffed skin of horse which during life suffered with glanders.

Implements used in the inspection of meat and animals for domestic and foreign trade. Alcoholic preparations of the nasal septum of glanders in the horse. Wax casts of fore arm and face of man who died of glanders.

Cultures of many bacteria and fungi, some pathogenic (disease-producing) and others not. Specimens of most of the parasitic worms which infest the lower animals.

Model horse shoes for the correction of deformities. Dried hoofs and casts showing the most common malformations and

diseases of the horse's foot. Casts of the various organs of the cow showing the lesions (manifestations) of the cattle plague.

Ten water-color drawings of some of the pathogenic bacteria.

Fourteen large photographs of milch cows with records.

Colored photographs of Union Stock Yards and packing houses in Chicago.

DIVISION OF BOTANY.

The principal part of the exhibit of the Division of Botany represented the working room of a seed laboratory, where seeds were tested to ascertain their purity and germinating capacity. Commercial seeds, together with their impurities, were weighed in a pair of fine balances in order to find the percentage of good seed, and from the good seed duplicate lots were carefully counted out and placed in a germinating chamber whose temperature was controlled by means of a thermo-regulator. The records of purity and germination were kept upon blank forms prepared for that purpose. There was also exhibited a simple homemade apparatus for sprouting seeds, by which the ordinary agriculturist can arrive at an approximate idea of the value of the seed he proposes to sow. The necessity for seed-control work in America was emphasized by the exhibition of samples of different commercial seeds purchased in the open market, some of which were mere screenings, consisting almost entirely of dirt and weed seeds, offered to American seedsmen by foreign dealers for the purpose of adulterating pure seed.

A class of inferior seed which is frequently found in American markets was illustrated by a sample purchased as yellow oat grass at $50 per 100 pounds, which consisted almost entirely of wood hair grass, worth about $10 per 100 pounds at wholesale.

In addition to a collection of the seeds of various forage and other economic plants, weed seeds, and seeds used in medicine, in the arts and for food, was a fanning mill for cleaning small lots of seeds, accompanied by a case containing over 100 sieves of different kinds and sizes of mesh for separating impurities from good seed, and a seed-scratching machine from Denmark, so constructed as to break the seed coat enough to allow water to enter, without causing injury to the seed. The importance of sowing seeds of large size was strikingly shown.

Three cases filled with life-size models illustrating the common species of edible and poisonous mushrooms, colored to represent the natural specimens, indicated the results of the investigations of the Department along this line.

The remainder of the botanical exhibit was devoted to the illustration of the most troublesome weeds in such manner as to indicate the differences in the character of growth, manner of dispersion, and present geographical ranges of different species, and, consequently, the different methods of eradication most applicable.

DIVISION OF BIOLOGICAL SURVEY.

The exhibit of this Division consisted mainly of graphic illustrations of (1) the geographic distribution of mam-

mals and birds in the United States, and (2) the habits of the various species in their relations to agriculture, horticulture, etc.

Among the chief exhibits were:

A large group of Southern birds and mammals found in the Austroriparian zone, the life area including the greater part of the Gulf States, and extending up the Mississippi bottoms as far as southern Illinois.

Groups of large mammals, injurious or beneficial to agriculture, including a coyote attacking a sheep; lynx eating grouse; minks, weasels and skunks.

Some injurious mammals of the Mississippi valley. Group of pocket gophers, showing underground galleries; manner of injuring crops and storing food. Common striped ground squirrel. Richardson's ground squirrel. Prairie dogs.

Eleven groups of birds and mammals illustrating food habits of each. Northern shrike or butcher bird hanging an English sparrow on a thorn. Kingbird and nest in apple tree. Cedar birds feeding on destructive elm-leaf beetle. Group of cuckoos illustrating their habit of feeding on hairy caterpillars. English sparrows in peach tree showing birds destroying buds and blossoms. Grackles feeding in meadow. Owls, English sparrows, and robin.

Groups of bobolinks showing breeding plumage of male and female and nest in a Northern meadow. Ricebirds or bobolinks in fall plumage, in a Southern rice field.

Group of red-tailed hawks. Group of short-tailed meadow mice.

Group of sparrow hawks feeding on grasshoppers and meadow voles.

Gray ground squirrel of the Mississippi valley. Cooper's hawk and flicker. Groups of mammals and birds of the arid deserts of the Southwest.

Exhibit of insects commonly eaten by birds.

Exhibit of food of hawks and owls.

Large relief model of the United States colored to show the natural life zones, or areas inhabited by special groups of animals and plants, and suited to the cultivation of particular crops.

Colored illustrations of prairie ground squirrels and gophers of the Mississippi valley, and hawks and owls of the United States. Numerous maps showing in detail the distribution of individual species of mammals and birds, some of the species being injurious and others beneficial to agriculture.

DIVISION OF ENTOMOLOGY.

The entomological exhibit covered the principal insect enemies of the leading staples, and comprised, exclusive of cotton insects, upward of 600 injurious species. These were grouped according to plants and animals affected, and related to some 30 orchard, field and garden crops, with parasites of domestic animals and household pests. There was also a special exhibit of the more important scale insects affecting fruit trees, and eight large cases representing injuries by insects to forest trees. With each of the insects illustrated, an effort was made to furnish a complete object lesson of its life

history, including examples of the injury done by it and an exhibition of its insect enemies and parasites, together with brief directions for remedial treatment and references to sources of fuller information. Insect enemies of cotton received special attention. This part of the exhibit included upward of 300 insects which occur on cotton and affect it either injuriously or beneficially. Of chief importance were two well-known cotton insects, the cotton worm and the bollworm. These, with other species, including the cotton-boll weevil, which has assumed special importance in the last year or two, were grouped together about an enlarged wax model of the cotton plant. In connection with them were wax models illustrating characteristic injury due to the bollworm and to the cotton worm. The bollworm exhibits included a collection of blown larvae illustrating different stages, and a series of moths representing males and females; samples of injured bolls, showing different forms of damage; wax models illustrating injury to blooms, squares,bolls, and leaves; colored figures illustrating the insect in different stages, and its injury; and a wax model of a spray of cotton illustrating different forms of injury already enumerated.

Among the other chief exhibits of this Division were:

A panel of insect enemies of citrus plants, comprising six boxes, illustrating the chief insects affecting orange, lemon, etc, with a number of bromide enlargements representing work with the insecticides in orange groves.

The hop louse was illustrated by greatly enlarged models of the different stages of the insect, and a wax model of the hop plant, representing healthy growth as contrasted with

the injury resulting from the hop louse; six boxes illustrating insects affecting canes, small grains, and live stock.

Insects affecting truck crops and insects affecting forage plants, with wax models of clover, tomato, potato and strawberry, illustrating these plants and the work of the insect upon them.

Comprehensive exhibit of the insects affecting Indian corn, both in the growing state and as a stored product, with a life-size model of the corn plant in wax as a center piece.

The more important insecticides, with brief directions for their preparation and application.

Common insect enemies of forest trees.

Insects affecting fruits and fruit trees, with models in wax illustrating injury to various fruits by insects.

The more important scale insects affecting fruit trees and an exhibit of the principal silk-producing moths, with enlarged anatomical models of the chinch bug, the domestic silkworm, the honey bee, and the cockchafer; also a box illustrating common household pests.

Series of maps showing the distribution of insects of prime importance.

DIVISION OF VEGETABLE PHYSIOLOGY AND PATHOLOGY.

In the exhibit of this Division four plant diseases were selected, the object being to show the steps taken in investigating the various problems connected with the work of the Division. For instance, the malady known as "die-back" of the orange was shown to be due to the presence of certain nitrogen-

ous compounds in the soil, and its peculiar characteristics were illustrated by means of colored plates, drawings, and photographs. Specimens of the disease were also exhibited, so that anyone interested could follow the various stages from beginning to end. Following these were shown the various apparatus used in investigating the disease. Photographs of the division laboratory and its accessories were included in this part of the exhibit. The effects of different amounts of water on plants were shown, together with those of different nutritive matters.

The most important class of diseases treated was that produced by bacteria, illustrated by showing the results of investigations in pear blight, a disease which has annually caused a widespread damage to the pear crop for many years past. It was demonstrated that through the efforts of the division the cause of this disease has been determined and means of checking its ravages have been discovered. The pear-blight exhibit showed the general apparatus used in studying bacterial diseases, such apparatus comprising the microscope, the dishes, etc, for making artificial cultivations, gelatin tubes, broths, etc, containing the food supplies for the minute germs. Following this were actual cultures of the pear-blight microbe grown in artificial media. The effects of blight were shown by photographs, colored illustrations, etc, with the method of combating the disease.

Another type of disease shown in the exhibit was that produced by fungi, a type of which is the so-called watermelon wilt, which is only too well known in the South. This disease was shown to have been produced by the minute fungus which at-

tacks the stem of the plant and so affects it that it is unable to obtain water. As a result the vines first wilt and then soon dry up and die. Methods for investigating and treating this disease were also shown.

The exhibit also displayed the different fungicides which have been found by long experience to be the most efficacious in the destruction of the fungus and fungous spores which come in contact with cultivated plants, and to effect such destruction without injuring the plants themselves. The various ingredients of these fungicides were also exhibited.

Wax models of diseased and healthy citrus fruits were shown, together with colored maps illustrating the distribution of the various diseases in Florida. The principal diseases of cotton were illustrated by means of colored paintings, which showed different stages of the diseases known as anthracnose, root rot, blight, etc, also models of diseased and healthy bolls. There were also enlarged photographs and maps, illustrating the distribution of various diseases in the United States generally, and their effects as seen in the field, and large photographs showing machinery at work in applying the fungicides, and illustrating the beneficial effects resulting from the application of such remedies.

DIVISION OF AGRICULTURAL SOILS.

The exhibit of this Division was neatly arranged in a pagoda and three large cases. The roof of the pagoda was supported by eight glass columns, each filled with a separate grade of sand, silt, and clay, which make up the texture or framework of most agricultural soils. Inside of the pagoda were a number

of 3-gallon glass bottles containing water, to illustrate the amount of water in a cubic foot of some of the principal types of soil adapted to different classes of crops. There was also a large cube of soil, with a wax model of a tobacco plant and a description of the principal physical properties of the soil. In other cases were exhibited eight different grades of sand, silt and clay in the exact proportions in which they are found in soils adapted to certain of the principal crops. This was designed to illustrate the marked difference in the texture and physical properties of the soils adapted to different crops, and to thus enable the farmer or planter to suit his planting to the soil. For instance, the exhibit showed that the truck soils of the Atlantic coast are composed largely of sand and contain a very small percentage of clay and but little or none of the coarser grades of sand. The effect of this was shown in the amount of water maintained by these two types of soil. The truck soil, owing to its loose, light texture, allows water to percolate through it rapidly, and maintains but a small amount for the use of crops, while the strong clay soil, by offering a far greater resistance to the descent of water, maintains a much larger amount for the use of crops. These more moist conditions are found to be favorable to such plants as grass and wheat, which require a long, uniform growing season in which to gather from the soil and atmosphere a large amount of food. The drier conditions in the truck soil are not favorable to the production of so large a crop, but the crop matures early in the season, when there is no competition from the crops on the heavier soils.

Different types of tobacco soil were shown, for the purpose of illustrating the very important influence of the texture and physical properties of soil on the development and type of tobacco. The bright tobacco soils of the South are found to have a texture very similar to the truck soils of the Atlantic Coast, and produce a small plant with a thin-textured leaf which cures to a fine golden color, if properly treated. The heavy shipping tobaccos are grown upon much heavier soils, containing a considerably larger percentage of clay, and are much more retentive of moisture than the bright tobacco lands.

The texture of the sea-island cotton soil exhibited was quite similar to that of the truck soils already mentioned. This soil is now used very generally for the trucking interest. The best type of upland cotton soil was shown to be stronger than the sea-island soil, containing from 20 to 30 percent of clay. A soil containing less clay than this, or maintaining less moisture than such soil normally does, is found to produce small plants, which put on a quantity of fruit in proportion to their size, and give a relatively small yield per acre, while a soil containing considerably more clay generally produces large plants and a luxurious growth of the vegetable part of plants, but with little tendency to the production of fruit.

DIVISION OF POMOLOGY.

The exhibit was intended to familiarize growers and the general public with the wide range of fruit species and varieties grown in the United States, and to direct their attention to the importance of selecting proper varieties for planting in different sections of the country, as the South. To ac-

complish this end, fruit models of more than 1,300 specimens, together with water-color paintings, photographs, fresh fruit, and living trees, were exhibited. These gave an opportunity for the comparison and estimation of the relative value of the different varieties for planting in different sections. The process of fruit modeling in the various stages of the work was also illustrated. Experiments in the preservation of fresh fruits in carbonic acid gas and vapor of alcohol were carried on during a portion of the time.

The following is a brief catalogue of this exhibit.

On a live Florida orange tree were exhibited models of blossoms and fruit illustrating various stages of development from the unopened bud to the ripe orange.

Photographs of species of the grape native to North America.

Methods of illustrating fruits and description of the operations of the Division of Pomology. The water-color paintings, photographs, and descriptive sheets were preserved for future reference. These are exact life size of specimens received; they are used in the identification of specimens, also in the illustration of the publications issued by the Department.

Collection of models of leading fruits grown in North America. Models are exact duplicates in size, form and color, of the originals. Different specimens of the same variety illustrate the variations observed in different sections of the country, probably due to differences in the soil, climate, and cultural methods.

Models in progressive stages of completion illustrating the process of modeling; also the principal materials and implements used.

The exhibit of fruits and nuts was renewed from time to time during the Exposition.

The preservation of fresh fruits in carbon dioxide was illustrated.

DIVISION OF AGROSTOLOGY.

A beautiful collection of grasses admirably illustrated the work of the Division of Agrostology, whose duty it is to investigate the natural history, geographical distribution, and uses of grasses and forage plants, their adaptation to special soils and climates, and the introduction of promising native and foreign kinds.

This division, having been only recently established, its exhibit was limited to a single stand, with specimens of the more important grasses and forage plants which are or might be grown in the South.

OFFICE OF FIBER INVESTIGATIONS.

The Office of Fiber Investigations brought together a collective cotton exhibit, including a series of 320 specimens. A series of cotton samples showed the progressive stages in the farm industry from the cotton boll to the baled lint, in the manufacturing industry from the open lint to the cloth, and in the cottonseed-oil industry from the seed to the refined

oils, soaps, etc. There was also a large and interesting collection of lint cotton, representing every important cotton country.

The other exhibits of this Division may be briefly catalogued as follows:

Illustrations of the flax industry. Series of flax straw samples; "object lesson" panel showing processes from flax straw to fiber; series of American flax samples, showing the difference between growing for seed and for fiber; foreign samples imported for manufacture; series showing American flax manufacture, flax threads, crash, etc. Illustrations of the household linen manufacture now supplemented by the factory system.

The American hemp industry: series of specimens from the unretted stalk to the manufactured cordage. Jute series: American and imported jute and jute manufactures; bagging, burlap, cordage and twine.

The ramie industry: stalks of American grown ramie, Chinese and American fiber--raw and degummed. Ramie manufactures, fabrics, laces, etc. Collection of American bast fibers for the most part not utilized in the arts, yet capable of cultivation in the United States.

The sisal hemp industry: Florida grown and imported sisal hemp, with American manufactures of cordage, binding twine etc. The Ixtle or Tampico fiber used in brush manufacture, in series, with allied species of agaves. Pineapple fiber, yucca or "bear grass", and Spanish moss, used for upholstery purposes.

Miscellaneous cordage fibers and their manufactures, such as New Zealand flax, manila, banana, etc. Cocoanut and the

palm fibers, with partial manufactures, cocoa matting, etc.

The palmetto industry. Series illustrating manufactures from saw palmetto, such as plastering fiber, coarse brushes, etc. The cabbage palmetto industry, with brushes made from the fiber. Imported palmetto, or crin vegetal. Fiber from pine needles, in series, with samples of bagging, matting and upholstery material. Fibrous bark. Esparto and its manufactures. Reeds and grasses used for fibers, and miscellaneous vegetable substances, fibrous in their character, useful in the arts.

Pedestal displaying photographic enlargements illustrating phases of the flax industry.

The same, illustrating Florida fiber industries, the growth of sisal hemp, pineapple fiber, etc.

The same, illustrating cotton, jute and ramie culture in the Southern States.

OFFICE OF EXPERIMENT STATIONS.

In the limited space at its command this office showed a number of its published records of investigations, and pointed out to the visitor the location of the various experiment stations throughout the United States, giving the ten principal lines of work pursued by these stations and the lines to which each station especially applied itself. To give a tangible and graphic idea of some of the results attained selections were made of certain important lines of work in dairying, the feeding of farm animals, and entomology.

Charts illustrating experiments in feeding farm animals were also shown, and an exhibit was given illustrating the investigations of food and diet.

DIVISION OF PUBLICATIONS.

This exhibit was unique in that it represented the work not only of the division itself, but of all the bureaus, divisions, and offices of the Department, the preparation of whose published reports of experiments made and results achieved it is the duty of this division to supervise.

A complete set of the publications of the Department in distinctive bindings was displayed in a handsome case, the volumes covering the period from 1837, when the Department of Agriculture had its inception as a section of the Patent Office, to June 30, 1895. An illustration in practical book-making was given, embracing all the work from the submission of the manuscript to the complete book, representing in a striking manner the manifold duties of editorial work, proof reading, and the supervision of the printing of reports, bulletins, and pamphlets of the Department. The objects exhibited comprised the original manuscript of the Yearbook for 1894 (of which 500,000 copies were issued) as edited and prepared for the printer, the galley and page proofs with the proof readers' marks thereon, the stitched volume, and the completed book.

In this connection there were also given some samples of the various methods employed in illustrating the Department publications, embracing processes of wood engraving, photo-engraving, half-tone, lithograph, heliotype, etc, in different stages of completion from the drawing or photograph, to the printed picture.

The exhibit of this division had on hand thousands of the popular pamphlets of the Department, which it distributed

free to applicants. Its exhibit also served as a bureau of information, in which capacity it furnished valuable assistance to visitors by answering inquiries in connection with the exhibits of the whole Department.

OFFICE OF ROAD INQUIRY.

Outside the Government building, occupying a space about 150 by 300 feet, was an object lesson very gratifying to those interested in the good-roads movement which is spreading so rapidly throughout the country. The Department of Agriculture by way of exemplifying clearly and concisely the immense advantage afforded by good roads, built as its road exhibit a system of parallel roadways, about 50 feet apart from center to center, including a modern macadamized road, a sand road and a dirt road. The grades of all the roadbeds were alike, each being divided into 50-foot lengths, the first of which was level, the grade of the other lengths rising at the rate of 2 feet in every 100, 4 feet in 100, and 6 feet in 100, respectively, making each road 200 feet long. The macadam road had, in addition, two 50-foot lengths rising 8 feet in 100 and 10 feet in 100, respectively. All the roadbeds were of the natural earth found on the terrace, which was a stiff red clay with some sand near the surface. No further preparation than that of grading was made on any of the beds except that of the macadam road. After the desired grade of this road was obtained, it was built up into a macadam pavement 6 inches deep and 12 feet wide.

On these specimen roads experiments were conducted to indicate the amount of draft on the different roads, in such manner that it could be readily observed by the spectator, and

the difference of draft on good and bad roads plainly seen. This was done with the assistance of a tractometer made for the purpose,

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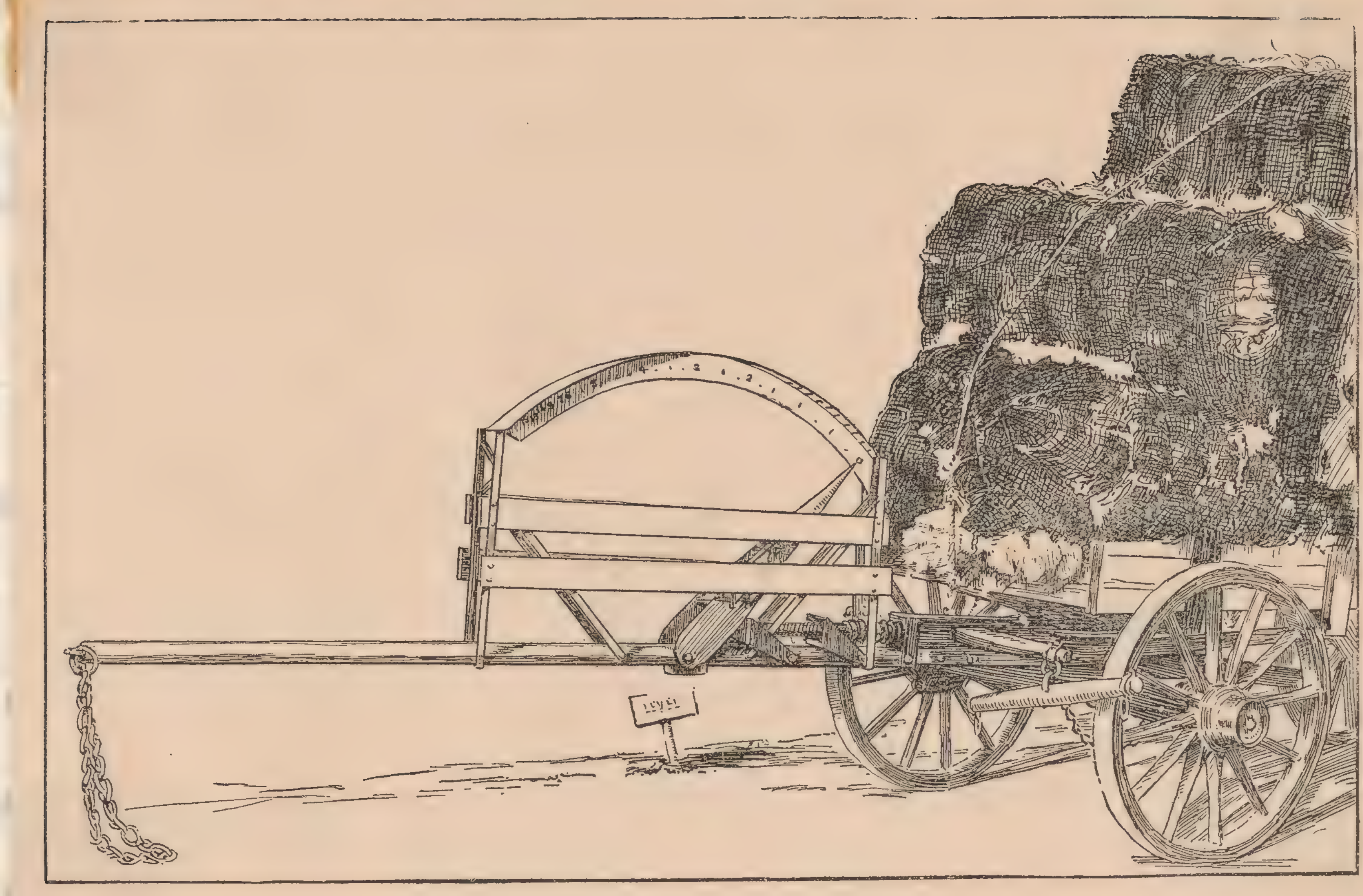

FIG. 1.—Tractometer attached for use.

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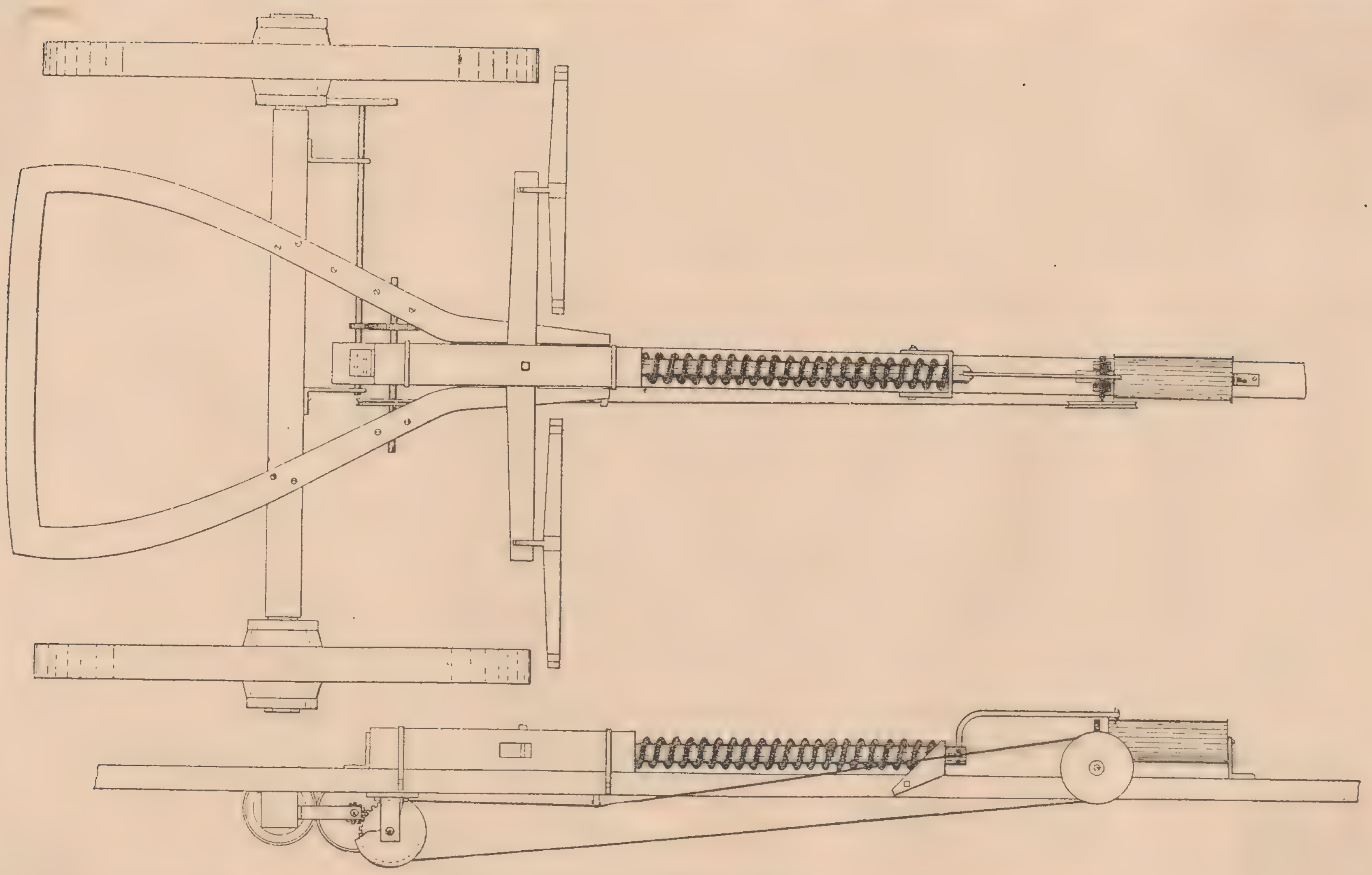

FIG. 3.—Tractograph.

advantages of wide tires, a portion of the clay road was made thoroughly wet and a wagon with 3-inch tires and one with a [illegible]

the difference of draft on good and bad roads plainly seen. This was done with the assistance of a tractometer made for the purpose,which measured the strain of the load on the team on each of the different roads. A wagon to which the tractometer was attached was drawn up and down the roads. On the smooth road the oscillation of the pointer arm of the tractometer had a range of some 50 pounds, while on the rutted dirt road it varied from 0 to 1,500 pounds, showing that, even while exerting the same average draft, a team is subject to much less fatigue on a smooth road. The experiment also suggested the desirability of having springs on the traces, or some other means of making the change of draft more gradual at the shoulders of the team, instead of subjecting it to the violent jerks which rigid traces transmit. In a general way the draft for the same load was found to be about eight times as much on the dirt road as on the macadam, and the draft on the sand road was nearly the same as on the dirt road when muddy.

During these experiments a team of small mules readily drew 12 bales of cotton on a heavy wagon up the 10 percent grade of the macadam road, the tractometer indicating a pull of 1,000 pounds, and the same team was completely stalled in going down the 6 percent grade of the sand road, after pulling the indicator to 1,900 pounds. Nine bales of cotton were removed before the load could be got in motion. The driver refused to venture at all on the dirt road with the 12-bale load.

The road exhibit also afforded a test of the practical advantages of wide tires. A portion of the clay road was made thoroughly wet and a wagon with 2-inch tires and one with 4 and

5 inch tires were run over it. The result showed how much less wearing on roads are wide tires than narrow ones. That part of the road which the narrow-tired wagon traversed was cut and rutted to the depth of several inches, while the remainder was rolled by the 4 and 5 inch tires into a smooth surface.

DIVISION OF FORESTRY.

Owing to its size and importance as illustrating some of our forest resources, the display of the Division of Forestry was separated from the rest of the Department exhibit and housed in a special building known as the Minerals and Forestry building.

An interesting exhibit of wood production greeted the visitor at the very entrance to this exhibit. It was a statistical pyramid formed of blocks intended to show graphically the amount of wood material furnished by the forest resources of the South for every second in the year. The base block, containing about 300 cubic feet and representing the entire amount of wood of all kinds and for all purposes, such as fuel, fencing, railroad ties, lumber, etc, indicated an annual consumption of about 10,000,000,000 cubic feet. A smaller block, of 48 cubic feet content, resting upon the base block, represented the amount of log material for lumber, timber, and bolt-size material cut per second, and indicated an annual output for all kinds of 1,500,000,000 cubic feet of logs, corresponding to over 10,000,000,000 feet, B.M. One of the interesting facts shown by this particular exhibit was that the two hard-wood-producing States, Tennessee and Kentucky, cut a larger proportion than the pine States. It was also demonstrated that the South fur-

nishes so far only one-quarter of the cut timber of the country, notwithstanding it still contains larger areas and the largest amount of standing timber, excepting the Pacific Coast, which is estimated to possess 1,000,000,000,000 feet of standing timber, B.M., while the Southern States possess 700,000,000,000 feet of standing timber.

The forest geography of the South was shown by a series of maps, each representing one of the Southern States and showing by colors the character of the forest growth in various portions of the State. Each map showed the distribution of the broad-leafed and coniferous species, and to some extent the density of existing forests.

One of the most interesting displays, served to show the farmer in a very graphic manner the costliness of a lack of judgment in making his clearings. The unintelligent denudation of the hillsides, in a country of large and precipitous rainfall, has caused, under careless cultivation, an erosion of these lands which has turned thousands of acres of tillable lands into wastes, furrowed and gullied and denuded of its fertile soil. To bring home an object lesson of such irrational treatment, and to illustrate the methods of reclaiming these waste lands and the possibilities of an improved agriculture on all the eroded soils of the South, a set of three relief models of an eroded farm was shown.

To accentuate this object lesson, a large relief map of the Holy Land, bearing the inscription "The land where once milk and honey flowed" was hung up over these farm models, and it was further shown that trees so wastefully cut as to destroy the forest in a very few years require many years to again pro-

duce material fit for the saw. This important fact was illustrated by a section of longleaf pine, the ring growth of which indicates an age of 372 years.

The entire arborescent forest flora of the United States, comprising among the richest and most varied species on the continent, representatives of 53 families, 136 genera, and nearly 300 species, were displayed by a series of panels requiring not less than one thousand square feet of wall space, each species being represented by botanical specimens, with flower and fruit, a wood section of the bark, and a label with a map giving the field distribution, the characteristics of growth, and the uses of its wood.

Some of the more important exhibits which it is impossible to describe at length, were the following:

Forest botany. (a) Trees of Southern States comprising 300 indigenous species, each illustrated by specimens showing mature foliage, flowers, and fruit, together with a section of wood showing bark and natural appearance of finished wood. Accompanying map shows geographical distribution of each species with notes on the habitat, development, character of wood and its economic uses. (b) Economically important species of the South; monographs of 20 species. Monster frame made of timber of the species inclosed (1) commercial, rough, sawed lumber, with cross section of log indicating commercial size of timber furnished by the species; (2) commercial cuts of lumber (radial, quarter and tangential swing); (3) photomicrographs showing magnified structure of wood in cross, radial and tangential sections; (4) development of the tree from germinating seedlings to the mature foliage and fruit; (5) label giving

common and scientific names on the character of the tree and wood; (6) map showing geographic distribution. (c) Photographic display illustrating the form development of various species. (d) Geographic distribution of arborescent genera shown by series of colored maps; comparative study of the regions occupied by various tree genera.

Turpentine orcharding. Industry illustrated as now carried on in the South, and also experiments for improving the methods of tapping. Photographs showing a typical distilling establishment; work of tapping an orchard; gathering, hauling and storing crude products. Various tools and other implements used in orcharding. Pine trunks showing various methods and stages of tapping employed in America and under improved methods. Complete display of the various grades of crude and manufactured products.

Pine and palmetto fiber manufactures. Various materials (jute, mats and carpetings) made from the Southern longleaf pine leaves, and from the palmetto.

Forest planting. Foreign trees suitable for planting in the South. Two specimens of acacia were shown, growing in pots; also specimens of wood and bark; analyses of bark as grown in Australia and California. Several species of the Australian tree, the Eucalyptus, are shown, including specimens growing in pots, wood specimens from Florida, and wood and botanical specimens from California. Seedling and bark of cork oak trees now growing in Georgia; also specimens from California. Fine specimens of the larger forms of bamboo (*Bambusa gigantea*) grown in Florida.

Effects of forest destruction and methods of recuperation in France, illustrated by a series of photographic reproductions.

Timber physics. This exhibit showed some of the methods of tests and examinations of Southern timber and results therefrom, particularly the four species of pine exemplified by samples, illustrating answers to various questions regarding their timber.

ORGANIZATION AND EXPENSES.

For the purpose of assisting the representative of the Department of Agriculture in the preparation, installation and return of the Department exhibit, the Secretary of Agriculture detailed the following chiefs of bureaus by which exhibits were to be made, or other persons to represent them:

Prof. C.F.Marvin, Weather Bureau.

Dr. C.L.Dawson, Bureau of Animal Industry.

Dr.L.O.Howard, Chief of the Division of Entomology.

Dr.C.Hart Merriam, Chief of the Division of Biological Survey.

Dr.B.E.Fernow, Chief of the Division of Forestry.

Mr.G.H.Hicks, of the Division of Botany.

Prof.B.T.Galloway, Chief of the Division of Vegetable Physiology and Pathology.

Mr.W.A.Taylor, of the Division of Pomology.

Prof.Milton Whitney, Chief of the Division of Agricultural Soils.

Dr.A.C.True, Director of the Office of Experiment Stations.

Mr.Geo.Wm.Hill, Chief of the Division of Publications.

Mr.Chas.R.Dodge, in charge of Fiber Investigations.

To aid some of these gentlemen several of their assistants were detailed as explained in the report of the Board. Mr.Charles R.Dodge acted as Chief of Installation and Special Aid to the representative of the Department.

The expenditures on account of the different bureaus and divisions were as follows:

Weather Bureau,	$2285.89
Bureau of Animal Industry,	716.71
Division of Statistics,	219.93
Division of Vegetable Pathology,	650.75
Division of Entomology,	417.27
Division of Agricultural Soils,	932.95
Division of Forestry,	3948.10
Division of Botany,	1075.37
Division of Agrostology,	16.40
Division of Microscopy,	333.52
Division of Biological Survey,	774.51
Division of Pomology,	534.38
Office of Fiber Investigations,	421.47
Office of Good Roads,	729.26
Cotton Exhibit,	344.15
Publications and Experiment Stations,	603.72
General Fund,	6114.75

Total Cost of the Exhibit of the Department of Agriculture, ...$20119.13

CHAS. W. DABNEY, Jr.,
Representative, Department of Agriculture.

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REPORT OF THE REPRESENTATIVE

# of the

Smithsonian Institution and National Museum.

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The exhibit made by the Institution was not as satisfactory as it was planned to be, owing to the small amount of money allotted for its preparation, transportation, installation, maintenance and return. Had it not been possible to draw extensively from the exhibits of the Museum that were procured for and shown at the World's Columbian Exposition at Chicago, and from the specimens of the Museum, the exhibit would have been even less creditable. With such resources as were at my command, I am pleased to say that an exhibit was made which, although small, proved itself to be both attractive and instructive. In preparing it, however, the halls of the Museum were dismantled, the collections broken and disarranged, and the whole Museum building presented an untidy appearance during most of last summer and winter.

The space assigned to the Institution for its exhibit was in the southeastern quarter of the Government building, and contained five thousand three hundred feet of floor space, exclusive of the central aisle. The approaches were by two entrances, one to the right of the southern portal and one to the left of the eastern portal of the building.

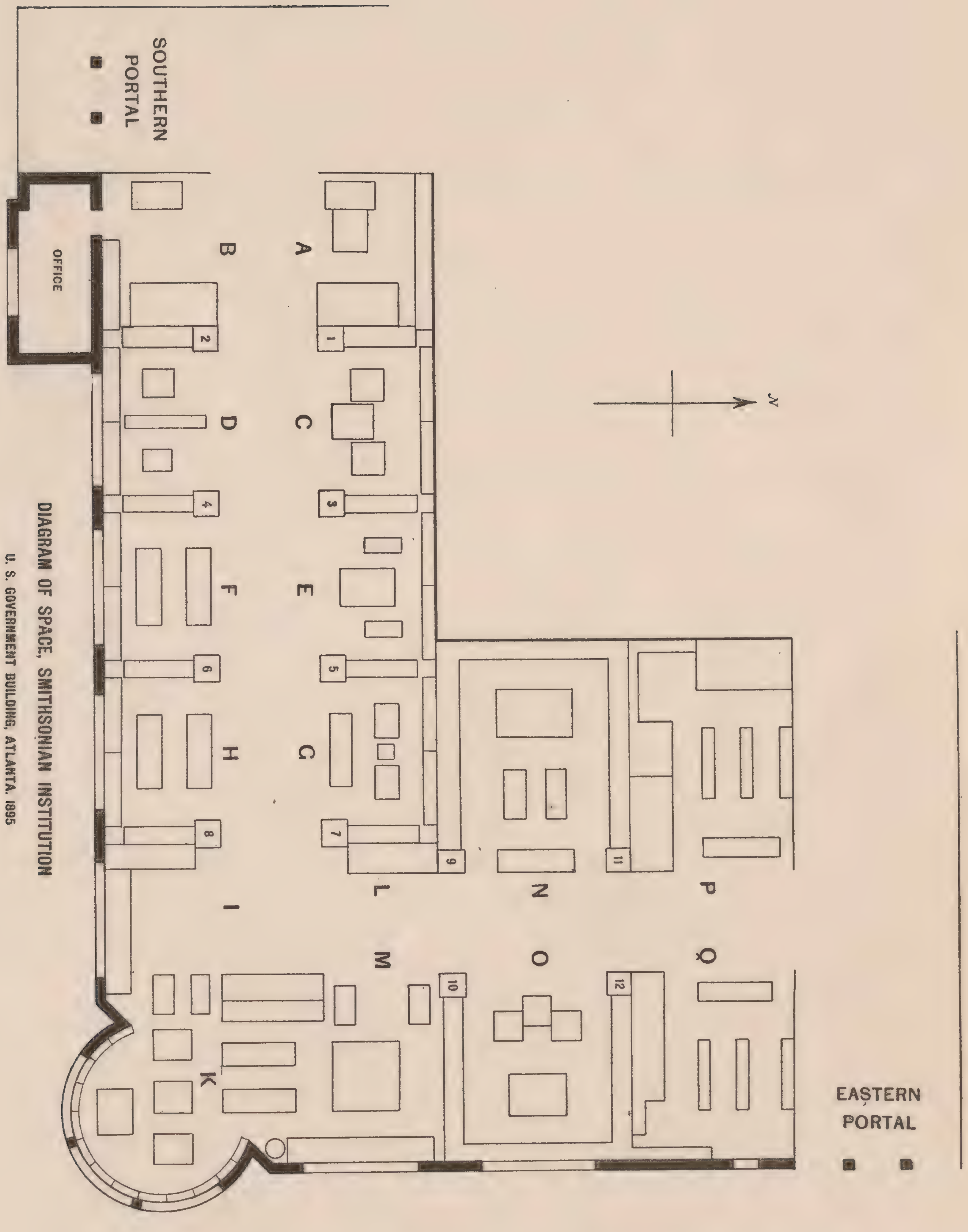

DIAGRAM OF SPACE, SMITHSONIAN INSTITUTION
U. S. GOVERNMENT BUILDING, ATLANTA. 1895

Most of the objects, as above stated, were from the collections of the National Museum, and they were so arranged as to enable them to be studied in regular sequence, beginning at the southern portal. They were grouped in alcoves twenty feet in width and from twelve to twenty in depth, on either side of a broad passage way one hundred and fifty feet in length as shown in the following diagram, and designated by the letters A. Q.

On the right of the main entrance were a large picture of the Smithsonian building, a portrait of Secretary Langley, and a complete set of the publications of the Institution, about two hundred volumes; also photographs of apparatus and illustrations of the work in the Astrophysical Observatory and photographs of the National Zoological Park. A map, twenty feet by ten, showing the geographical distribution of the correspondents of the Institution, twenty-four thousand in number, as entered on the books of the International Exchange Bureau, also one of the fifty sets of Government documents which are sent annually abroad by the Bureau.

In making the arrangement referred to, an attempt was made:-

(1). To give as good an idea as possible of the character of the treasures which are preserved in the Museum, by presenting an epitome of its contents, with contributions from every Department.

(2). To illustrate the methods by which Science controls, classifies, and studies great accumulations of material objects, and uses these as a means for the discovery of truth.

(3). To exhibit the manner in which collections are arranged, labeled, and displayed in a great Museum.

(4). To afford as much instruction and pleasure as possible to those who visited the Atlanta Exposition, to impress them with the value of museums as agencies for public enlightenment, and thus to encourage the formation fof public museums in the cities of the South.

DEPARTMENT OF MAMMALS.

In the entrance alcoves (A., B.), was placed also the contribution of the Department of Mammals. In a large wall zase was a series of forty-three specimens to illustrate the range of forms in the class of mammalia, and in a general way the manner in which they are classified by naturalists.

Each of the eleven orders, Primates, Chiroptera, Insectivora, Carnivora, Rodentia, Ungulata, Cetacea, Sirenia, Edentata, Marsupialia, and Monotremata were represented. There were also five groups mounted in the best style of modern taxidermy, and intended to show, by the use of natural accessories, how the animals appeared in their native haunts. Flanking the arch on one side was a group of Rocky Mountain Sheep or Bighorns, _Ovis canadensis_, six in number, from Wyoming, and on the other a group of Rocky Mountain Goats, _Mazama montana_, three indivi-

duals, collected in British Columbia and Montana, by Mr. George Bird Grinnell. There was also a family group of the Coyote or Prairie Wolf, Canis latrans, mounted by Mr. W. T. Hornaday, from specimens obtained in Montana, and one of the finest examples of mammal mounting in existence; also a family group of the Nine-Banded Armadillo, Tatusia novemcincta, from Texas, and another of the American Badger, Taxidea americana, from Kansas.

TYPES OF MANKIND.

Near the entrance stood a portrait statue of Osceola, the great Seminole chief, who was born on the Chattahoochee River, in Georgia, in 1804, and who led his people in the Florida Indian War, which was ended by his capture and his death in 1838. This figure was modeled by Achille Colin and Theodore Mills, from a portrait by George Catlin, and represents the war chief at the time of his greatest power.

Beyond the archway attention was first attracted by a series of costumed figures, which were arranged on the sides of the main hall at the entrance to the alcoves. These were intended to illustrate the physical characters and the ethnical costumes of twelve of the most characteristic types of the human species. The costumes, most of which were now exhibited for the first time, had been collected by the explorers and correspondents of the Institution, and the figures, in sculptor's plaster, have been modeled either from life or from abundant material in the Museum, under the superintendence of Prof.

Mason and the immediate direction of Dr. Walter Hough. Each of the four divisions of mankind was represented by three figures.

Although dispersed through the entire Exhibit their relation to each other is so intimate that they are here grouped together. Their sequence is indicated by the large numbers above the cases.

BLACK TYPES.

(1). Papuan, of New Guinea, modeled by Theodore A. Mills, from photographs in the National Museum.

Costume: a feather plume, earrings, and nose-pin, anklets of shell-disks with boar's tusk pendant, armlets, and wristlets of shell, and a large waist-belt of bark, carved on the exterior.

(2). Australian, from the Clarence River district, Australia; modeled by Theodore A. Mills, from photographs.

The figure carries a boomerang and wears an apron of Kangaroo skin.

(3). Zulu, from Southeast Africa, modeled by Henry J. Ellicott, from photographs by Emil Holub.

Costume: an apron of cow tails: assegai held in hand.

BROWN-RED TYPES.

(4). American Indian, of the Jivaro stock of Peru, modeled from a life-sized painting by Peruvian artist in National Museum.

Costume (collected by Lieut. W. E. Safford, U. S. N.): apron of feathers of tropical birds upon a foundation of bark cloth, anklets, etc., of seeds, beetle wings, and teeth of monkey and puma.

The Jivaros live on the headwaters of the Maranon and are thought to belong to an independent stock.

The other native stocks of North America are represented more fully in groups elsewhere displayed.

(5). Dyak, from Borneo, modeled under the direction of W.T. Hornaday from photographs made by himself in Borneo.

Costume: a Malay sarong. The weapons are a spear of native manufacture and shield with tufts of human hair, and a curious serpentine dagger of the form called the creese.

(6) Maori, of New Zealand, modeled by Henry J.Ellicott, from New Zealand photographs in the National Museum.

Costume: robe of New Zealand Flax, *Phormium tenax*; shoulder cape of feathers. Scepter of a chief held in both hands.

The Maoris, at present on the verge of extinction,are among the most perfect types of physical beauty.

YELLOW TYPES.

(7). Eskimo, from Hudson Bay, modeled by Theodore A.Mills, from photographs and from life masks in the National Museum.

Costume: reindeer skin with gloves of polar bear skin; collected by New Bedford whalers.

(8). Tibetan, from Eastern Tibet, modeled under the direction of W. W. Rockhill from photographs taken by him in Mongolia.

Costume: a woolen robe and boots of native manufacture.

(9). Siamese, modeled by Theodore A. Mills, from photographs obtained by General J. B. Halderman, U. S. Minister to Siam.

Costume: robes of native fabrics, presented by the King of Siam.

WHITE TYPES.

(10). Arab sheik, modeled by Monsieur Hébert, replica of his figure in the Trocadero Museum, Paris.

Costume: woolen robe or burnoose, turban of camel's hair, with cord, etc., gift of the Trocadero Museum.

(11). Armenian, from Erzerum, modeled by Theodore A. Mills, from life.

Costume (collected by Talcott Williams, of Philadelphia): a turban, embroidered coat and trousers and robe of blue gros-grain silk, shot with gold.

(12). Berber, from North Morocco, modeled by Theodore A. Mills, from photographs by Talcott Williams.

Costume (collected by Talcott Williams): an inner garment and outer robe called the haik; gun of native manufacture.

DEPARTMENT OF BIRDS.

The birds were shown in six cases, five of which contained groups mounted in the midst of accessories which represented their natural surroundings and are intended to illustrate their habits and characteristics of different ages and sexes. (Alcoves C, D).

Bower-Birds and their Playhouses.--This illustrates the curious habits of the Satin Bower-Birds of Australia which construct a "run," or bower of twigs, decorated with brightly-colored feathers, shells, bleached bones, and other conspicuous objects. They steal buttons, and other bright things from the natives, who, it is said, search these bowers for objects which they miss from their houses.

Lyre Birds and their Dancing Mound.--The Lyre Bird, Menura superba, is peculiar to Australia, where it inhabits the densest forests. It has a curious habit of building round hillocks, upon which the male parades with outspread tail while uttering his curious cries.

American Flamingoes and their Nests (from a photograph).--This group shows the manner in which the Flamingo sits upon its eggs; the specimens are from the Bahama Islands, where the nests are made of decomposed white coral.

Mexican Jacanas.--These specimens, from Lake Patzcuaro, in Michoacan, Mexico, illustrate the peculiar habit of walking upon floating leaves of aquatic plants, for which these birds are well adapted by their long, slender toes.

"The Interrupted Dinner."--This group, mounted by Mr. F. A. Lucas, received a diploma of honor at the Boston Exhibition of the Society of American Taxidermists. A Red-Tailed Hawk while eating a Grouse or Pheasant, is attacked by a marauding Goshawk.

Collective Exhibit of Birds of Paradise.--A representative collection, including about thirty different species of this family of birds from New Guinea, so remarkable for the beauty of its plumage.

DEPARTMENT OF REPTILES.

A group of the poisonous snakes of the United States (Alcove E), in connection with which was shown the important illustrated memoir upon "The Poisonous Snakes of North America" by Dr. Leonhard Stejneger, which had just been published by the Museum.

The specimens had been brought together from widely separated localities.

The following species were represented:

1. Diamond Rattlesnake, Crotalus adamanteus, Southwestern States; 2, 3. Banded Rattlesnake, Crotalus horridus, Eastern States, south to Florida and the Mexican Gulf, west to Kansas; 4. Prairie Rattlesnake, Crotalus confluentus, Great Plains; 5. Western Diamond Rattlesnake, Crotalus atrox, Southern United States, from Texas to the Gulf of California; 7, 8. Southern Ground Rattlesnake, Sistrurus miliarius, Southeastern States;

9, 10. Copperhead, Agkistrodon contortrix, Eastern and Southern States; 11-13. Water Moccasin, Agkistrodon piscivorus, Southeastern States; 14. Harlequin snake, Elaps fulvius, Southeastern and Gulf States.

DEPARTMENT OF FISHES.

The Department of Fishes shows (Alcove E) a portion of a collection, which, if exhibited as a whole, would have contained a representative of every one of the two hundred and fifty existing families of fishes. The abridged collection actually shown included seventy-three of the most characteristic American families.

The method of installation was a new one.

DEPARTMENT OF COMPARATIVE ANATOMY.

This collection occupied the wall space in Alcoves C. and D., and its exhibit, arranged by Mr. F. A. Lucas, was intended to illustrate the structure of a considerable number of the most interesting types of the animal kingdom.

The collection was arranged in four groups as follows:

Representative Forms of Invertebrate Animals.--Here were exhibited most of the orders of the invertebrate animals in such a manner as to illustrate their external appearance, general structure, and mode of growth. The smaller and more perishable forms, as well as certain details of anatomy, were illustrated by enlarged models and drawings.

Embryology and Development.--Here was shown the early stages of various animals, showing the curious transformations undergone by the Starfish, the Water Beetle, the Lancelet or Amphioxus, the Trout, and the Frog; the development of the domestic fowl and the earlier stages of man. There was also a series of models showing the development of the Gastrula, the most important and significant germ form of the animal kingdom, through which all animals above the Protozoa pass in the earliest period of development.

Modification of the Skeleton for Locomotion.--This series was intended to show how the Fish, Turtle, Penguin, and the Seal, representing four classes of animals, are so modified as to be all equally at home in the water; how the Bat can fly like a Bird, a Frog leap like a Kangaroo, and a Snake swim, climb and crawl, although it possesses no limbs at all. The modifications of the skeleton for climbing are illustrated by a Macaque, a Specter-lemur or Tarsier, and a Sloth; modifications for leaping by the Jerboa, Kangaroo, and Frog; for crawling, by a Water Snake; for digging, by the Mole and Gopher; for swimming, by the Fur Seal, the Penguin, the Turtle and the Golden Mackerel or Crevalle; for sailing, by a Flying Lemur, or Colugo, a Phalanger, and the strange little lizard, Draco volans, known as the "Flying Dragon;" for flying, by a Stork and a Bat.

Above the cases are shown the skeletons of a Black Bear, a Tapir, a Manatee, and a Porpoise.

Anatomical Models Illustrating Structure.--These Models are on a large scale, and are intended to show organs which are so minute in size, or so delicate in structure that they cannot otherwise be exhibited. One model illustrates the structure of the Precious Coral, and teaches how the various single polyps are connected with each other and to have a common circulation so that what is eaten by one benefits all. Others show, upon a large scale, the various organs of complicated anatomy of a large Fish, a Medusa, a Fluke-Worm, a Marine Worm, a Bee, a Frog, and a Perch.

DEPARTMENT OF MARINE INVERTEBRATES.

This exhibit was in part, a continuation of that of the Department of Comparative Anatomy and included, arranged nearly in systematic order, a series of specimens representing the principal groups of marine animals, beginning with the lowest or Protozoa, and embracing at the other extreme the Ascidians and Cephalopods and the Amphioxus or Lancelet, which is by many authorities regarded as the transition between invertebrate and vertebrate animals.

An attempt was made to show the general character of the lower forms of animals which inhabit the ocean. The series began with the Foraminifera, the smallest of the shell-bearing Protozoa, and ends with the forms which are believed to be the nearest to the vertebrate animals. Most of the types shown are familiar only to the professional mnaturalist, and are not even

provided with popular names; no attempt was made, therefore, to describe this series in detail or to do more than mention some of the most familiar types. Sponges were shown, both as they grow and after preparation for use, and among them was the beautiful lace-like "Venus' Flower Basket." There were also Sea-anemones, Corals, and Jelly-fishes, among the specimens illustrating the group Coelenterata, etc., some of the most beautiful being from the Naples Zoological Station and the explorations of the Fish Commission off the New England coast. Among the Sea-Worms are the forms known as Sea-Mice, Sea-Centipedes, and Tube-Worms. The group known as Echinodermata was illustrated by specimens from each of its five orders: (1), The Crinoids or "Sea-Lilies;" (2), The Starfishes; (3), The Ophiurans or "Brittle-Stars;" (4), The Echinoids or "Sea-Eggs;" (5), The Holothurians or "Sea-Cucumbers." There were also specimens of the Cephalopod Mollusks, including the Pearly Nautilus, the Octopus or "Devil-Fish," and the Squids and Cuttlefishes.

The series ended with the representative of the so-called Protochordata, which includes the Ascidians or "Sea-Squirts," and the Lancelet, which, as has been said, occupies debatable ground, and was also shown in the exhibit of the Department of Fishes.

DEPARTMENT OF MOLLUSKS.

This was shown in Alcove F, and is properly a part of the synoptic series of marine invertebrates. It was exhibited

in a single table case, and Mr. C. T. Simpson had made the most of the very small space available in selecting specimens which showed the wonderful beauty and variety of form in the class of Mollusks. The exhibit is described by him as follows:--

The families and sub-families of recent shell-bearing mollusks are arranged essentially according to Tryon's "Structural and Systematic Conchology," nearly all the shell-bearing families are represented.

In the collection Nos. 1 to 4 represent families of the Class Cephalopoda, the most highly organized of the Mollusks. It includes the Chambered Nautilus, represented by numerous species in past geological ages, but of which only four species are now living; the Argonauts, or Paper Sailors, a genus in which the female only has a shell, or rather an egg-case, which is detachable from her body; the Octopuses, Cuttlefishes, Squids and Ammonites; the last being extinct shells with marvellously complicated chambers.

No.5 represents the Pteropoda, a class of Mollusks having thin, fragile, glassy shells which float on the surface of the sea. They are sometimes called "Sea Butterflies," and serve as food for whales.

Nos. 8 to 136 represent the Class Gasteropoda. Of these Nos. 66, 67, 70-75, 129-132, are families which inhabit fresh water; Nos. 119-128 are terrestrial, and the remainder for the most part live in the sea. The shell of the Gasteropods is typically spiral, but varies from a mere flat plate like

that concealed under the mantle of Limax, through conical, tubular, and coiled forms to the regular spiral. Nearly all spiral shells are dextral (right-handed), but some few families or genera are sinistral (left-handed), as for example the Achatinellidæ (No.118). The Gasteropods include a large number of useful, ornamental species. Among those of economic importance are the Buccinidæ, the Littorinidæ, and the Trochidæ, many of which are used for food.

No.137 represents the class Scaphopoda. The shells of some of this class are used by the Indians for making wampum.

Nos. 138 to 199a represent the class Pelecypoda or Bivalves. Most of these are marine, but Nos. 179 and 180 live in fresh water. Many are beautiful and valuable, while others are injurious. The wood-borers (No. 141) destroy the piling and the planking of vessels and dry-docks. Some of the Mytilidæ and Ostreidæ are edible. The Aviculidæ produce pearls and mother-of-pearl.

The class Brachiopoda, which doubtfully belongs with the Mollusca, was extremely abundant in past geological ages but is now represented by only a few species, most of which inhabit deep seas.

DEPARTMENT OF INSECTS.

This display occupied the wall space in Alcove F, and was of course very far from completeness either as an exhibit of insects or as an illustration of the wealth of material in the entomological collections of the Museum. Here, thanks to

the pains of Prof. C. V. Riley, the limited space had been utilized to admirable advantage. The exhibit is described by him as follows:-

The chief exhibit, arranged in twenty-four frames, is designed to illustrate the peculiarities of the various families of insects. It is limited to Hexapods, or Insects proper, and does not include the Spiders, Mites, and Myriapods, and in fact some of the families of the true insects are necessarily omitted. The object of this family exhibit is a twofold one: first, to give the student the salient characteristics by which he may be enabled to refer any insect to the family to which it belongs, and also to illustrate what are considered as family characteristics as compared with the larger and lesser groupings or alliances. The second object is to give a very good exhibit of the North American fauna, since by selecting types illustrative of each family the beholder gets a very fair impression of the character of the North American insect fauna, the family illustrations all being drawn from North America.

The second portion of the exhibit is designed to relieve the monotony of a series prepared solely for instruction by adding something pleasing to the eye. Thus eight frames have been arranged as a sort of attractive entrance to the alcove. These consist of beautiful Lepidoptera and Coleoptera which have been purposely chosen from the four great sections of the globe not represented in the family collection. Thus

there are two boxes of European butterflies and moths, one of Asiatic, one of African, three of South American and one of South American beetles. These "show" cases, for such they practically are, differ, however, from similar show collections in having each insect properly named, so that many a specimen which has perhaps become familiar to the Museum or Exposition visitor by virtue of its attractiveness and brilliancy will here be properly introduced by name, and thus give an added pleasure to those who wish to be able to call things by name.

DEPARTMENT OF PALEONTOLOGY.

The exhibit occupied one double case in Alcove G, and was intended to show, so far as could be done in a small space, the character of the collections in the Museum and the manner in which they are arranged and labeled. It included one hundred and sixteen species of North American fossils, arranged according to their geological age, and is described as follows by Mr. Charles Schuchert:-

The fossils are arranged in the order of their appearance, or chronologically, with a view to illustrate some peculiar characteristic of the geological systems. The surface distribution of each system is shown on the colored map of the Unoted States, on top of the case. The oldest undoubted fossil-bearing horizon in North America is the Cambrian which is distinguished for the variety and abundance of its trilobites or lowly organized crustaceans (shown on the extreme left of the case). It is remarkable that so early in the history of life,

great diversity of structure is attained, since this system has all the essential types of invertebrate animals or organisms without internal hard skeletons, such as Sponges, Corals, Molluscs and Crustaceans. In the next section--the Ordovician system--the Mollusca or shell-bearing animals are present in great diversity of form. These animals continue prominently throughout all succeeding geological formations and are particularly abundant in the Tertiary strata. The Devonian is marked by extensive coral reefs, of which but a few species can be here shown on account of their large size; at this time peculiar strongly armored fishes also abound. The Carboniferous system, more particularly the Lower Carboniferous, is characterized by the development of Crinoids or stone lilies, animals related to Star-Fishes. A number of excellent specimens from the celebrated locality at Crawfordsville, Indiana, are shown. This system is also peculiar for the first abundant and diverse development of land plants whose remains have supplied the material for the many coal seams. In the shale bands between the coal or in the roofs of coal mines beautiful ferns abound, some of which are shown.

In the Carboniferous air-breathing animals occur rarely but in subsequent strata land animals are more numerous. In the Jurassic or the system immediately below the Cretaceous great reptile-like animals, the Dinosaurs, abounded, some seventy feet and more in length, continuing to the close of the Cretaceous. Among shelled animals the Ammonites are particularly peculiar to these systems.

From the Tertiary formations of the Rocky Mountain region their young have been exhumed many and diverse mammals or animals that suckle. These are the ancestors of many modern land animals now inhabiting land areas than North America. Among them were other very small horses with three toes on each foot, camels, tapirs, elephants, etc. One of the characteristic sea animals of this time abounding in the Gulf border region is the Zeuglodon Whale, a form related to both whales and seals. A restoration of the skeleton of this long and slender animal is shown, suspended from the roof. The shelled animals of this era at once remind us of living species.

This collection also aims to show methods of displaying fossils now in use in the Department of Paleontology. The fossils are cleaned of all adhering rock, and when possible a series of each species is selected to show specific varieties, being then glued upon encaustic tiles. The advantage of tiles lies in the fact that they will neither fade nor warp, are more uniform in size and nearly as cheap as paper or thin wooden tablets. In cases where the attached specimens must be removed this can readily be accomplished by soaking in water without injury to the tiles.

DEPARTMENT OF GEOLOGY.

In a single case in Alcove H. was a collection illustrating the occurrence and association of Gold and Silver in nature, which is thud described by Prof. George P. Merrill:--

The exhibit begins with a series of specimens showing both the native metals and their compounds in the condition of greatest natural purity. This is followed by a series of the same compounds with their characteristic associations, but in which the metal-bearing portions are still plainly evident, and this in turn by a third series showing selected types of the ores, ~~but~~ as mined, but in which, as a rule, the metal or its compounds are scarcely discernible.

Attention is called to the fact that while gold, aside from its native form enters as an essential constituent into less than half-a-dozen known minerals, silver occurs in upwards of six times as many. Thus gold, aside from its natural alloys with silver, (electrum) bismuth and palladium, is found in chemical combination with other elements only in the minerals petzite, sylvanite, krennerite, and nagyagite. Silver, on the other hand, is found native, as an alloy with gold (electrum), or mercury (amalgam), and also as an essential element in compounds forming nearly forty mineral species more or less well defined.

Several of these compounds are very rare, and not at present included in the series exhibited.

It is further to be noted, that while both gold and silver occur either as native or in compounds of such size as to be easily seen by the naked eye, the great majority of ores of either metal are composed in large part of other substances with which the metal is so finely and intimately admixed as to

be invisible and determinable only by chemical means or where it occurs as a replacing constituent with other elements. Thus the most common form of gold ore is an auriferous pyrites,while the most common silver ore is an argentiferous galena.

In the series as exhibited attention needs be called, first, to the native gold, that is, the gold found in the metallic state in nature, as displayed in the form of nuggets, leaf gold, wire gold, and gold-dust from various localities; second, to the compounds of gold with silver, tellurium, antimony, and sulphur as shown in the minerals petzite, sylvanite, krennerite, and nagyagite; third to the occurrence of the native metal with its associates, either as dust or nuggets in sand and gravel, or impregnating quartz, slate, calcite, and other minerals forming the characteristic gangue, and lastly to the series of gold ores, representing the metal-bearing rocks as usually mined, and which, while, as above- noted, showing no trace, on casuel inspection of the precious metal, nevertheless contain it in sufficient amount to render its extraction by chemical or mechanical means a profitable industry.

The silver-bearing series is arranged in a similar manner. It is to be noted that while gold is common in deposits of sand and gravel, as "placer gold," silver very rarely occurs in this form, and is represented here only by the silver-bearing sandstone from Washington County, Utah. Native silver in the form of "wire" or "moss" silver is, however, comparatively common as shown in the specimens from Mexico and Saxony.

Some of the silver-bearing compounds are of great beauty, as illustrated in the ruby silvers proustite and pyrargyrite.

The total annual production of gold and silver for the world, for 1894, is given as 8,616,892 ounces of gold, and 166,437,408 ounces of silver.

DEPARTMENT OF MINERALS.

This department (Alcove G) was represented by a collection of high educational importance, arranged by Mr.Wirt Tassin, under the direction of Prof. F. W. Clarke, the curator, and is described as follows:-

Entering the alcove the wall cases contain a series of minerals selected and labeled to illustrate the several properties or characters of one mineral species as compared with other mineral species, in other words, "Comparative Mineralogy."

The first case on the left contains a series of one hundred and forty-three minerals illustrating Chemical Mineralogy; that is, the composition, variation in composition, and the relation of composition to form of minerals.

The chemical composition of minerals is illustrated by several typical elements together with a majority of their combinations. It will be observed that gold has comparatively few combinations and that its occurrence is practically restricted to the element; while iron, the most useful of the heavy metals, rarely occurs as the element, yet affords a great number and variety of compounds.

Proceeding from left to right the next case contains a series of models and specimens illustrating the principal forms of minerals depending upon molecular structure or form.

Beginning with the systems of crystalization each system is represented by a typical crystal group followed by models and specimens showing the principal forms belonging to that system.

For example, fluorite, a typical isometric mineral, is shown, then a glass model of the fundamental isometric form, the octahedron, and spinel; a typical octahedral mineral. Following the systems of crystallization are Crystal Aggregates, including twin crystals, parallel growths and imperfections of crystals.

The next wall cases contain series illustrating isomorphism, pseudo-morphism, and the various characters depending upon the action of the several physical forces, such as Light, Cohesion, Mass, Heat, etc.

The floor case on the left contains several minerals arranged to show the great diversity and beauty of their coloring.

The floor case on the right contains meteorites showing the general character and composition of those bodies. Attention is called to the large meteorite on the pedestal weighing seven hundred and forty-six pounds from Canon Diablo, Arizona, and to the several other meteoric irons in the case, from the same locality. These irons are of interest because of the

great size and extent of the "fall," over ten tons of them having been found in the region, and also from the fact that they contain microscopic diamonds.

SYNOPSIS OF ARRANGEMENT.

Comparative Series.

1. Chemical Mineralogy.--Chemical composition. Variation in composition. Relation of composition to form.

11. Physical Mineralogy.--Crystallography, Compound Crystals, Isomorphism, Pleomorphism.

Pseudomorphs.--Characters depending upon Light.--Luster; Color; Diaphaneity. Charters depending upon Cohesion.--Cleavage; Fracture; Tenacity; Hardness.--Characters depending upon Mass, Heat, Magnetism, and Electricity.--Specific gravity; Fusibility; Magnetism; and Electricity.

DEPARTMENT OF BOTANY.

This exhibit occupied three sides of Alcove H, and consisted of a collection of the woods and shrubs of Japan mounted in a very priginal and beautiful manner by Japanese artists. To each species was devoted a polished panel, made of its own wood, upon which were painted the leaves, flowers and fruit, while the panel was framed with its own bark.

The collections belonging to this department are, for the most part, not available for exhibition purposes, being chiefly dried specimens for research work. The National

herbarium contains a quarter of a million mounted plants.

DEPARTMENT OF METERIA MEDICA.

The exhibit of this department, Alcove H, consisted of a case illustrating the composition of a number of the principal mineral waters used as beverages and for medicine. By the dise of a bottle of the water as found in commerce are placed a number of smaller bottles, which contain the amount of each chemical substance found in the amount of water shown in the first bottle. Here also is a case which illustrates the composition of the human body by displaying in bottles the exact quantity of each substance to be found in the body of a man of average size (one hundred and fifty-four pounds), while in a parallel series are shown the quantities of each element in the same man's body.

DEPARTMENT OF PREHISTORIC ANTHROPOLOGY.

This exhibit occupied Alcove I, and consisted of a small, carefully selected collection of implements and objects used by man in prehistoric times, the specimens being mostly American.

The explanation of the Exhibit is contributed by Dr. Thomas Wilson:-

In this exhibit seven hundred and ninety-two specimens are displayed, as follows: Stone, four hundred and ten; copper, one hundred and ten; shell, twenty-six; bronze, seventy-eight; gold, twenty-six; bone, eighteen; pottery, one hundred and twenty-four.

Anthropology is the Science of Man considered in all of his parts and nature. Prehistoric Anthropology is that part of this great science which relates to man in prehistoric times. "Prehistoric" means before written history was begun in the locality or country under consideration. History begun several thousand years earlier in Egypt and the Classic Orient than in Gaul and Britain, and these fifteen hundred years earlier than America. Knowledge of the existence of prehistoric races began with the discovery, about the year 1806, of the Ages of Stone, Bronze and Iron in the Scandinavian countries. It was not recognized in its full scope until the discovery in France, about 1859, of what is called the "Chipped Stone" or "Paleolithic" Age. Since the antiquity of man has been a subject of lively discussion in most countries, and many attempts have been made to construct the history of his early times. The announcement by Darwin of his theory of "Evolution" as the origin of the human species added interest to the investigation. The study of the life, customs, culture, and, indeed the making of the history of prehistoric man can only be done through the investigation of objects made and used by him. This investigation considers their condition, the mode of their manufacture, their associations, and the places wherein they have been buried, with the incomplete information we get from the skeletons; in its relation to the North American Indian we are dependent upon the objects we find in his workshops, his destroyed homes, or in his graves and monuments. We study his mounds and earthworks,

cemeteries, village-sites, quarries, and workshops. We find his axes, hatchets, adzes, and gouges, and from these we speculate how he felled trees, cut wood, made boats, sledges, saddles and the hundred objects of wood employed by savages. His stone quarries and workshops show the raw material, and how he manufactured his implements by the processes of chipping, grinding, polishing, and drilling. The same for horn, shell, and bone, of which we possess many thousand objects made into beads, pins, gorgets, and other ornaments. The copper and gold objects are to be studied on the same lines. Pottery was much used, by Prehistoric Man, and its manufacture was carried on wherever he dwelt. The pottery exhibit is displayed on the shelves above the flat-topped cases. To the right are specimens of European Prehistoric Pottery of the Neolithic and Bronze Ages. This is followed by ware from the Aborigines of the United States. The long shelves in front contain specimens from Mexico, Central and South America. On a pedestal is a reproduction of an "Ogham stone," illustrating a rude written language, which was prevalent in Ireland at a very early day.

THE ORIGIN AND SIGNIFICANCE OF GAMES.

In the next Alcove (K), which occupied the circular tower in the southeast corner of the building, is displayed a special collection illustrating "The Origin and Significance of Games in all Parts of the World," especially prominence being

given to chess and cards. The display was made in co-operation with the University of Pennsylvania, and has been arranged by Mr. Stewart Culin, director of the University Museum:-

The objects, arranged in a progressive series, fill thirty-four upright cases, like pictures in frames, and one large table case. They form an almost complete history of cards and chess, beginning with the primitive forms, originally used, for divination, down to the games of the present day.

Especial interest attaches to the fact that the clue to the origin of both chess and cards was found by Mr. Culin, with the aid given by Mr. Cushing, among the aboriginal people of America. The pack of cards is shown to have originally consisted of a bundle of arrows, marked with the signs of the world quarters. The shaftments, or feathered part of these arrows, bearing cosmical marks were first used in fortune-telling, and from their use our card games arose.

In America the Indiana did not get beyond the use of carved and painted staves. The American case shows the arrows of the McCloud River Indians of California, marked with colored ribbons, by which they were distinguished. Side by side with them are the gambling-sticks of the Haides of Vancouver's Island, similarly marked with rings of color and used like cards in their gambling even at the present day. In the adjoining case, devoted to Eastern Asia, the practice arrows of Korea are shown and with them the derived playing cards here made of oiled paper yet bearing, both on their backs and faces, devices copied from

the cut feathers of the arrows. With them are Chinese cards with the same emblems surviving as markers or indexes at the ends. These cards are "double-headers," as indeed were the gambling sticks, carrying back the idea of our common playing cards with double heads and index marks to the most remote antiquity. The Japanese cards in the same case bear emblems derived in part from the same source, while the circular cards, called Gunify, of which a beautiful pack is shown, are painted in colors to correspond with the world quarters. A single pack of the national cards of each of the principal countries in the world follow, comprising in Europe, Germany, France, Spain, Italy, Switzerland, Austria, Sweden, England and Russia. The card series closes with the pack with pictures of the Chicago Exposition and the cards with pictures of the confederate flag, made in England for sale in the South during the war.

The chess series begins like that of cards with the divinatory games of primitive people, in which our game originated. America is here again conspicuous, and with the objects representing the first steps in the evolution of the game are shown other common things, such as visiting cards and the folding fan, which Mr. Culin traces with chess, to the marked arrow of primitive culture. The historical chess series comprises boards and men from India, Burmah, the Malay Peninsula, the Maldive Islands, Korea, China and Japan.

The specimens are all arranged as if actual play.

DEPARTMENT OF ARTS AND INDUSTRIES.

In Alcove K was shown also a small case containing a collection of ancient glass from excavations in the vicinity of Tyre and Sidon, remarkable not only for its beauty of form but on account of the entirely iridescent coloring which it has acquired through having been buried in the soil for twenty centuries or more.

Adjoining this was a case of carved ivories from Japan. The native sculptors have shown, with great minuteness and accuracy, the costume, tools, and methods of work of a large number of the native mechanics before the introduction of any European implements--the carpenter, the mason, the armor-maker, the lantern-maker, the unbrella-maker, the cooper,etc.

Here also was shown a collection to illustrate the development of the Ceramic Art in Japan. This had been arranged by Mr. Heromich Shugio, and although it did not contain any considerable number of very costly pieces, it was historically quite complete, and was described by Mr. Shugio as follows:-

Japanese history mentions that some pottery was made in a village of Idsumi to a considerable extent from the very early days, and that another factory was in existence in the province of Ouri during the period of 581-660 B.C. Twenty-nine years before the Christian era Tenno Suijin ordered that human figures made of burnt clay be buried with his wife, Empress Hihasubrime, in place of her attendants, as had been customary until that time whenever any member of the Imperial

family died. This humane decree abolished an abominable custom, and the pottery in its infancy played one of the most important and noblest acts in history.

The early productions were of mere unglazed burnt clay, not like those of the early American pottery.

The introduction of the potter's wheel by Giyoki, a priest of Idsumi, in 724 A.D., must be taken as the real beginning of our Keramic art.

The first glazed stoneware is said to have been made by Kato Shiroye now at Seto, in the province of Owari, in 1223 A.D., after his return from China, where he spent several years in studying Keramic art. From his time, Seto became the centre of Keramic art, and all the Keramic productions came to be called "Seto mono" in Japan, as all the porcelains are called "China" in Great Britain and America.

The first porcelain was made by Gordayu Shonsui, a native of the province of Ise, who studied Keramic art in China in about 1513. His productions were mostly made with Chinese materials, which were brought back by him from that country and they were decorated in blue under the glaze.

The greatest progress in Japanese Keramic art has been made since the triumphant return of the Corean Expedition in 1859, when many skillful Korean potters were brought over, and the famous Keramic factories of Hizen, Higo, Chikuzen, Satsuma, Tosa, Nagato, Yamashiro, Owari, etc., were either established or improved by those potters.

The first potter who succeeded in decorating porcelain with enamel paintings over the glaze was the celebrated potter Kakiyemon, of the Sakaida family of Nangawara, a village near Arita, who mastered this secret of enamel painting from Tokuzayemon, of Imri, who learned his method from a captain of a Chinese ship at Nagasaki in 1640.

Kakiyemon was assisted in his essays in enamel painting by Gosu Gombei, another well known potter. In 1646 Kakiyemon is said to have sold his decorated porcelains to a Chinese trader in Nagasaki, and thus he has the honor of being the first Japanese potter who decorated porcelain with enamels, and who sold Japanese pòrcelains to a foreigner. Since then his productions were bought by Chinese and Dutch traders at Nagasaki to export. He was honored by Prince Naheshinia Samio, of Hizen, by being appointed a special maker to His Highness. Specimens numbers 150 and 151 are his works. Although they are not his best works they will be found, on close examination, to be the works of a master hand.

Nisei, the great Kioto potter, through the generosity and liberality of Wankiu, a wealthy Osaka merchant, succeeded, during 1655--'57, in decorating pottery with enamel painting after the newly introduced method by Kakiyemon, now so much admired as the Ninsei ware. Number 53 in this collection is a specimen of this great potter, and Numbers 54, 55, 56, and 57, are copies after his works. Numbers 56 and 57 were copied by Okumura Shozan, of Kioto, who is perhaps the best copyist of Ninsei, since his time, and some of his copies are often mistaken

for the originals even by Japanese connoiseurs.

Another important epoch in our Keramic art was the discovery of the use of saggers in baking porcelains by Tsuji Kizayemon, a noted potter of Arita, during the Kwhmbum period (1661-'72). The porcelains baked in saggars are called "Gokuskin Yaki." Number 152 is a specimen of this Gokuskin Yaki made by one of his descendents who were honored by being appointed makers to the Imperial Court of Kiota. The porcelain was and is made at Arita; Okawachi (where Naheshima aware was made); Mikawachi (where Jirado ware was made); Shiraishi, Kameyama, etc. in the province of Hixen; at Seto, in Owari; at Tajimi, in Mino; at Kutani, in Haga; at Kiyomidsu, in Yamashiro; at Sanda, in Settsu; at Himeji, in Harima; at Hikone or Koto, in Omi; at Ota and Tokio, in Musashi; at Okayama, in Kii; Wakamatusu, in Iwashiro; etc., of which nearly all the factories are represented in the collection. Of the important factories where the pottery (Faience and Stoneware) was and is made this collection represents Satsuma; Karatsu; in Hizen; Takatori, in Chikuzen, Yatsushsro, in Hogo; Shiga, on the Island of Tsushima; Hagi or Matsumoto, in Nagato; Suwo; Shido, in Samuki; Kosohe, in Settsa; Akahada, in Yamato; Kioto, in Yamashiro; Shigaraki, in Omi; Seti in Owari; Tachikui, and Sasayama, in Tamba; Fujiria, in Idsumo; Iga, Sado, Kutani, in Kaga; Soma, in Iwaki; Imbe, in Bizen; Mianto, in Idsumi; Banko, in Ise, etc.

The collection is displayed in three cases in Alcove K, by provinces, in accordance with the following plan:-

Hizen	Karatsu.	Idsumi	Idsumi.
	Arita.	Yamato	Akahada.
	Hirada.	Survo	Survo.
	Nangawara.	Nagato	Hagi.
	Nabeshima.	Chikuzen	Takatovi.
	Kakiyemon.	Higo	Yatsushiro.
	Tsryi Gokushin.	Satsuma	Satsuma.
	Kameyama.	Settsu	Sanda.
	Bogasaki.		Kirko.
	Shiraishi.		Kosube.
Taishiu (Island of Tsushima).	Tsushima.	Iwaki	Soma.
Owari	Seto.	Kaga	Kutani.
	Horaku.	Ise	Banko.
Bizen	Bizen.	Sado	Sado.
Omi	Shigaraki.	Sanuki	Shido.
	Koto.	Yamashiro	Raku.
Kii	Zuishi.		Kioto.
Iga	Iga.	Musashi	Tokio.
Tamba	Tamba.		Ota.
Idzumo	Idzumo.		

Across the aisle (Alcove L) was a small series of musical instruments intended to illustrate the character and method of arrangement of the very extensive collection in the National Museum. A series of five times the extent had been selected to be sent to Atlanta, but the limitations of space

were such as to make it necessary to reduce this, as well as every other exhibit.

The collection is intended to illustrate a few of the stages in the progressive evolution of stringed instruments. The series begins with a rude musical bow of Mashonaland, which is used only to mark time and is audible only to the performer who holds one end between his teeth. At the other end of the series are the guitar and violin; the former represented not only by the well-known European instruments, but by related forms from India and Africa. Intermediate stages are shown by a number of interesting types named and described upon the labels. The series selected for Atlanta contains about two hundred instruments; the small portion of it shown gives but a meager idea of the great collection in the National Museum, which includes some three thousand forms.

DEPARTMENT OF ORIENTAL ANTIQUITIES AND RELIGIOUS CEREMONIAL.

Alcove M was devoted to a collection of objects illustrative of the Bible, arranged under the direction of Dr. Cyrus Adler, custodian of the collection of Religious Ceremonials in the Museum. An attempt has been made to show representative specimens of most of the classes of objects which are of value to the students of the Bible, and the collection, though necessarily limited through lack of space, may fairly be said to have constituted a minature Biblical Museum.

The archaeology of the Bible is represented by a collection of casts illustrating the ancient Hittites, frequently mentioned in the Bible from the time of Abraham down; by an Egyptian mummy secured by the late Hon. S. S. Cox, U.S.Minister to Turkey; busts of Rameses, the second, supposed to have been the Pharaoh of the Exodus; and of his father, Seti. Assyria and Babylonia are represented by a model of a temple tower of Babylon, especially constructed for this Exposition. This Temple Tower was situated in the outskirts of the city of Babylon. The model is made after the description of Herodotus, and the report on the ruins discovered by Sir Henry Rawlinson. There is also a cast of a huge Assyrian Winged Lion, eleven feet long, and eleven feet high, such as were placed to guard the doorway of Assyrian Temples; cast of the Chaldean account of the Flood, etc. Palestinean Archaeology is represented by casts of Moabite stone, Siloam inscription, and Temple stone.

The ancient religion of the Jews is represented by a case containing a selection of the more important objects of Jewish ceremonial. Still another case shows a collection of the gems of Palestine, with a model illustrating the method in which the gems were placed in the High Priest's breastplate. There is also a collection of coins struck in Palestine, as well as those which appeared in Bible times in cities mentioned in the Bible. In another case is a collection of musical instruments of Palestine and adjacent countries, which differ in nowise from those used in ancient times. To these are added a few representations of musical instruments from Egyptian and

Assyrian monuments. A collection of domestic implements, such as are mentioned in the Bible, and a relief map of Palestine, are also shown.

In this connection there is also exhibited a collection to illustrate the history of the Bible, as a book, and to show the important translations which have been made of it. The Hebrew Bible is represented by portions of an Egyptian manuscript of the fourteenth century, facsimile of the Aleppo Codex, by the first American edition of the Hebrew Bible printed at Philadelphia in 1810; by other well-known prints of Amsterdam, Antwerp, and Hamburg. The Septuagint or Greek version is represented by facsimiles of the famous Alexandrian and Vatican codices. Following these are copies of the Targum or Aramean version, the Syriac version; the Coptic version (represented by a manuscript); the Ethiopic version; Gothic version, Anglo-Saxon version; the edition of the Latin version or vulgate of St. Jerome; a Spanish-Jewish version; the Arabic version (represented by a manuscript); and the translation of Saadia.

The New Testament is represented in the Vatican and Alexandrian Codices, already mentioned, as well as in the Sinaitic and by the first American edition printed at Worcester in 1800.

Finally, there is a most interesting and valuable work, consisting of a New Testament arranged in historical order by clippings from the Latin, Greek, French, and English Testaments, all arranged by Thomas Jefferson. This Book contains a concordance of the verses used, and a number of notes scattered

throughout, all in Jefferson's handwriting, and is said to have been arranged by him for translation into the Indian languages, so that the Gospels might be presented to the Indians in a simple form.

DEPARTMENT OF TECHNOLOGY.

Alcove N was occupied by objects designed to show the more important stages of improvement through which the appliances now in use for the conveyance of men and goods from place to place have passed before the present high standards of mechanical efficiency were attained: These were selected with the special purpose of illustrating the important influence exercised by the South Atlantic States upon the early history of internal improvement in America and the inauguration of transatlantic commerce ~~in~~ by steam. The theory upon which they are arranged is thus described by Mr. J. E. Watkins:-

The origin of many of the contrivances now utilized by man to facilitate individual movement or to transport objects too heavy to be carried by man belongs to a period so remote in prehistoric time that no attempt to arrange aboriginal water or land vehicles in a definite chronological sequence has been made.

Boats and Ships.--Primitive boats, such as the Catamaran and Dugout Canoe, are placed at the beginning of the series which contains among the craft propelled by poles or oars the Ohio River flatboat, and keelboat by the instrumentality of which the settlement of the Southern and Western States was

promoted during Colonial and Revolutionary times. Among the sailships are to be found the "Sally Constant," from which the first English settlers in the United States landed at Jamestown, Virginia, in 1609, and the Mayflower which brought the Puritans to Plymouth Rock eleven years later.

The American Steamboat.--The fine rivers of America stimulated the exertions of several ingenious men living on the Atlantic seaboard to adapt the steam engine to navigation. Prominent among these pioneers, whose labors make good America's claim to the birthplace of the steamboat, was James Rumsey, some of whose experiments upon the Potomac River were witnessed by General Washington as early as 1787. A model of Rumsey's steamboat of 1788 and of that made by Fitch about the same time are shown together with the model of the first screw propelled steamboat to navigate the waters of any country built by John Stevens in 1804. Fulton's "Clermont" of 1807, Stevens' "Phoenix" of 1808 are also in the series which contains a model of the steamship "Savannah," built in 1818 by Georgia capitalists, which has the distinction of being the first steamship to cross the Ocean sailing from Savannah, Georgia, for Liverpool on her initial voyage, Saturday, May 22, 1819. The original log-book containing the account of this historic voyage, is deposited in the National Museum.

The collection further embraces the following series:

1. Boats pushed by poles or propelled by paddles or oars.
2. Sailboats (driven entirely by the wind).
3. Steamboats.

The American Railway.--As the South Atlantic States were foremost in the introduction of transatlantic steam navigation, so were they early in the field of railroad construction. The first railway line, one hundred miles long, built and operated in the world, was the railroad, one hundred and thirty-nine miles long, built by the South Carolina Railroad Company from Augusta, Georgia, to Charleston, South Carolina; and the first steam locomotive built upon the Western Continent for actual service was the "Best Friend," which was built for that road in 1830 and went into service in the following year.

Various forms of locomotives experimented with in England and America previous to the construction of the "Best Friend" are illustrated.

The First Steam Railway Train in the South Atlantic States.--The South Carolina Railway was built upon plans which would now entitle it to be called an elevated railway. A model showing the method of track construction upon which is placed the first steam train that ran in the South Atlantic States December 14, 1830. Near it are placed models of sleeping-car appliances built for railways terminating at Richmond and Petersburg, Virginia, the earliest forms of sleeping berths used in American cars.

Land Vehicles.--For the purposes of this Exposition the Land Vehicles are arranged under the following classifications:

1. Land Vehicles drawn by men or domestic animals.

1. The Rolling Load.
2. Sledges and Rollers.
3. Vehicles with solid (or nearly solid) wheels.
4. Vehicles with wheels containing spokes.

II. Land Vehicles propelled by natural or generated forces.

1. Experimental sail cars and hore-power locomotives.
2. Experimental Steam Locomotives.
3. Experimental Electrical Locomotives.

Early Electrical Apparatus.--In no other department of science have American investigators, from the very beginning, been so successful, not only in the discovery of fundamental truths, but also in the prompt application of the principles deduced therefrom to useful purposes as in the domain of electricity.

The success of Franklin's experiments in the year 1784 in the construction of what he calls the "Electrical Wheel" is illustrated, for the first time, in these collections in the models of the two devices involving the most important principles utilized in the modern motor as described by Franklin in his letter to Peter Collinston, London, dated that year and published on page 252 of his autobiography. Strangely enough no prominence has been given to these ancient electrical machines in subsequent scientific writings relating to the history of electricity.

In the models and photographs of the apparatus designed in 1829 by Joseph Henry, the First Secretary of the Smithsonian Institution, are found the instruments by which the

electro-magnet was for the first time utilized to convey a signal to a distance; in it is embodied the principle upon which the modern electrical telegraph is based. The first instrument to make a permanent record of words transmitted over a wire by the agency of electro-magnet was designed and constructed by Samuel F. B. Morse in 1837. A model, an exact reproduction of the original machine, too precious to risk removal, which is now in the custody of the Western Union Telegraph Company, has been obtained through the courtesy of the president of that Company.

Actively associated with Morse from the date of his earlier experiments was Alfred Vail, a man of great ingenuity and rare mechanical ability.

The original telegraphic instrument by which the historic message, "What hath God wrought," was received at Baltimore, May 24, 1844, and constructed under the direction of Vail. It is one of the valuable treasures deposited in the United States National Museum, the removal of which being prohibited on the ground of safety, is illustrated by a model of full size.

Limitations of space, unfortunately, prevent a more extended exhibit of apparatus connected with the origin of the telephone, the dynamo, and the application of the electrical current for producing light, and the transmission of power.

Following is a brief outline of the apparatus exhibited:

III. Early Electrical Apparatus (models only exhibited).

1. Apparatus designed by Benjamin Franklin.

2. Apparatus designed by Joseph Henry.

3. Telegraphic apparatus invented by Morse and Vail.

In the same Alcove were shown the contributions of the Department of History and Numismatics. These consisted of a series of coins and medals, as follows:--

(a) Principal coins occurring in the North American Colonies from 1525 to the establishment of the United States Mint in 1793.

(b) Medals commemorative of the Revolutionary War.

Among the most interesting coins are the "Oak Tree" shillings 1652, and the "Mark Nubby" penny, the "Rosa American" penny, the Continental dollar, of the copper coins issued by the Colonies before the Revolution. Here also are shown three colored sketches of birds by John J. Audubon, the most famous painter of birds who ever lived, who was born near New Orleans, in 1781.

BUREAU OF AMERICAN ETHNOLOGY.

The exhibit of the Bureau of American Ethnology occupied Alvove O was prepared under the direction of Prof. W.J. McGee, who describes it as follows:-

This exhibit illustrates three representative Indian tribes of North America, viz: Cherokee, Papago and Seri. The Cherokee Indians represent a large and impprtant Iroquoian family or stock; the Papago tribe forms the leading branch of the

Piman stock; while the Seri Indians are the sole representatives of their family. It has been thought better to make moderately full exhibits of a limited number of tribes than to illustrate a large number of tribes incompletely. The Cherokee tribe was selected for representation because of its local interest; the others because they are little known and the collections are quite new.

The Cherokee Indians were the oboriginal owners of the pine-clad hills and fertile valleys of what is now northern Georgia, the western Carolinas, eastern Tennessee, and a part of Virginia. They were the first occupants of the site of Atlanta; they lingered long in their old hunting grounds; and while most of the tribes have disappeared from the woodlands and mountains a few remain in the eastern Cherokee reservation in Swain county, North Carolina, within one hundred and fifty miles of Atlanta. The collections illustrating the Cherokee Indians comproses pottery and basketry, largely of primitive types; the aboriginal bow and arrow, with the singular blowgun, which attracted much interest among the earliest white explorers; the eagle-feather masks and tortoise-shell rattles, and other paraphernalia of the primitive ceremonials; stone implements and pipes; pottery-making tools and domestic utensils; articles of costume and personal adornment; fishing spears, etc. The collection was made within a few years by an expert familiar with Indian customs, who was enabled to obtain the most ancient and sacred, as well as the modern possessions of the Indians. While many of the articles are accultural (or affected by the

influence of the higher race), many illustrate fairly the aboriginal ideas of the Indians of southeastern United States. The collection fills one wall case, with the larger articles arranged above it.

The Papago Indians are a tribe of the desert; they occupy the hot and dry Papagueria (the most arid region of equal extent in North America), lying south of the Gila river and west of the Sierra Madre mountains in Arizona and Sonora(Mexico). Their mode of life is a blending of the nomadic and agricultural; they establish settlements by springs and water holes, and, while the ground is moist from one of the rare storms, they plant maize, melons and beans, which quickly mature; and when the spring fails or the water hole dries up, the rancheria is abandoned and the people scatter in search of other sources of water. In autumn they collect the fruits of different species of cactus, mesquite, beans, etc., and in winter they migrate to the mountains of Mexico, where they live by hunting. Although discovered and highly esteemed by the early Spanish explorers and missionaries, the Papago Indians are little known outside of their own territory; the collection exhibited is the first one of note, both as to articles and photographs every brought to eastern United States. It embraces pottery and water-tight basketry, in the making of which these Indians excel; the crude plow, akin to that of ancient Egypt, and the still more primitive spade or digging stick; games of divination and diversion; musical instruments; bows and arrows, which are still in limited use, with some of the stone implements used by ancestral tribes

in the same region; rope-making material and apparatus; domestic utensils, costumes and the like. The collection is arranged in three wall cases, one of which is allotted to the peculiar articles made chiefly of the agave; these include the mat used for bedding, basketry, the cradle, etc. In addition there is a large floor case showing life-size models of Papago women engaged in pottery-making, with examples of the pottery made by the tribe; and the peculiar carrying basket and costumes introduced were those found in actual use among the Indians last autumn. Many of the articles are accultural, since the Papago Indians have borrowed from the white men such arts as seemed good in their sight; but a part(including the pottery and basketry) are primitive, and some represent perfectly the aboriginal condition of the tribe--among these being the family and other fetiches still in constant use among the Papago Indians. Two additional floor cases contain models of the Papago habitations, which are commonly built of a peculiar grass over a frame work of mesquite poles, more rarely of adobe.

The Seri Indians occupy Tiburon Island, in the Gulf of California, and a considerable area of the adjacent mainland of Sonora, Mexico. They are probably the most primitive Indians remaining in North America; they are without agriculture, and have no domestic animals except dogs. Their food is fish and water-fowl from the sea, and game from the land, commonly eaten raw, with the fruits of cacti, mesquite beans, berries, acorns, etc., in season. They have been at war with the neighboring tribes and with whites for three-and-a-half centuries, and lose in the same region; rope-making material and apparatus; domestic utensils, costumes and the like. The collection is arranged in three wall cases, one of which is allotted to the peculiar articles made chiefly of the agave; these include the mat used for bedding, basketry, the cradle, etc. In addition there is a large floor case showing life-size models of Papago women engaged in pottery-making, with examples of the pottery made by the tribe; and the peculiar carrying basket and costumes introduced were those found in actual use among the Indians last autumn. Many of the articles are acculturral, since the Papago Indians have borrowed from the white man such arts as seemed good in their sight; but a part(including the pottery and basketry) are primitive, and some represent perfectly the aboriginal condition of the tribe--among these being the family and other fetiches still in constant use among the Papago Indians. Two additional floor cases contain models of the Papago habitations, which are commonly built of a peculiar grass over a frame work of mesquite poles, more rarely of adobe.

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The Exhibit includes twelve transparencies (photographs on glass), six representing the Papago Indians with their houses, occupations, costumes, etc., while six represent the Seri Indians with the flimsy wickiups used on the mainland; their seaside houses, consisting of turtle-shell elevated on rocks or poles, have never been photographed.

DEPARTMENT OF ETHNOLOGY.

At the north end of the long isle (Alcoves P and Q) and adjoining the eastern portal was the exhibit of the Department of Ethnology. This space is adjacent to the east entrance, and is actually one of the entrances to the Smithsonian space. On either side of the archway were shown groups of Indian figures, clothed in their native costumes, and engaged in their customary occupations. Especially conspicuous was the Sioux chieftain, in full war paint, mounted on his gaily housed pony, and with feathers headdress sweeping to the ground; while facing him was a group of Kiowa Indians engaged in moving their habitation, some mounted upon a horse, and others carried behind it by means of primitive appliances known as the "travois." Beneath there was a group of Kiowa children, another of Navajo women weaving blankets, also a Crow warrior painting his blanket, and a Chippeway writing an inscription on a tablet of birch bark. Another very striking group of seven figures represented a religious ceremony practiced by the Indians of Prince Rupert's Sound. The principal figure is an Indian who is personating a cannibal, and who is about to leap into the house through a circular door. Two men are holding him back, while four musicians in front are playing upon their rude instruments. The remainder of this space is occupied by an exhibit prepared at the express desire of the ladies in charge of the Woman's Building, showing the arts which are practiced by women among primitive peoples, especially in North America. This collection includes

implements for basket-making, pottery, weaving, bead-work, sewing, agricultural implements, and appliances for burden-bearing. These are all fully named and explained upon the labels. The theory which has guided Prof. O.T.Mason in the selection of this series is explained by him as follows:-

The object of this exhibit is to show the share that women have had in the industrial progress of the world.

In that continual struggle called Progress or Culture men have played the militant part, women the industrial part. A study of modern savagery is a guide to the activities of our own race in primitive times, and this teaches us that women were always the first house-builders and furnishers, and that they devised the utensils of the humble apartments. They were the first clothiers, whether in skins at the north or in vegetable fibre nearer the equator. It was the women who went first to the field with baskets that they themselves had fabricated; they gathered the seeds of plants, bore them home on their backs, ground them on rude mortars, and from the flour made their mush or dough. They invented all sorts of fireplaces and ovens, pottery, and cooking utensils, and the many things employed in the serving and consuming of food.

In early society women were literally the first beasts of burden, and it was they that devised all sorts of frames for the carrying of children, and bands, and baskets for carrying loads.

Both men and women in savagery are touched with the sense of beauty, the former in the adornment of the person, the

weapon, and the canoe, the latter in the technique of basketry, weaving, embroidery and pottery.

In a small space it was designed to bring together a few examples of primitive woman's work in order to show the paths along which the sex has traveled in times past. The bead-work, the embroidery, the personal ornaments, the blankets, mats, belts, and looms, the utensils connected with food, the conveniences of housewifery, the barkcloth, the delicate handwork in palm leaf, the pottery, the exquisite skin-dressing, and implements of Americans, Africans, and Polynesians were silent witnesses of the genius, patience, and skill of women in savagery.

It is hoped that mahy thousands of those who, for the first time viewed a portion of the collections of the National Museum at the Atlanta Exposition will hereafter have the opportunity of seeing the Museum in its entirety in Washington.

G. Brown Goode,

Representative, Smithsonian Institution and

U.S.National Museum.

IN MEMORIAM.

G. Brown Goode.

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George Brown Goode was born in New Albany, Indiana, on February 13, 1851, and died at his residence in Washington City on September 6, 1896.

Doctor Goode was of early American ancestry and traced with pride his descent from John Goode of Virginia, who was a soldier under Bacon in 1676. On his mother's side he was descended from the Cranes of New Jersey and other New Jersey families, who were conspicuous in the War of the Revolution.

His father, after freeing his slaves, moved to Ohio, and then went to New York, where the boyhood days of Doctor Goode were spent.

The young man entered Wesleyan University in Middletown, Conn., and was graduated there in the class of 1870, showing during his course a marked predilection for studies in natural history. After graduating he went to Cambridge, Mass., where he soent a short time in natural history studied under the elder Agassiz. While so occupied he was recalled to his alma mater to take charge of the natural history collections then

about to be installed in the Orange Judd Hall, a building which had recently been presented to the University. This was the beginning of his museum experience, and in it he showed remarkable ability, which subsequently was developed to a greater extent in Washington. Meanwhile he continued his studies in natural history, and in 1873 met Spencer F. Baird, then at the head of the United States Fish Commission. Appreciative of the ability of the younger man, Professor Baird promptly tendered him an appointment in the Fish Commission, with which he continued as a member of one of the summer parties for several years.

As the relations between himself and Professor Baird grew closer, it became evident to the latter that his services could be used to advantage in the National Museum, to which he became attached as early as the winter of 1877, becoming in time Assistant Director, and in 1887 Assistant Secretary of the Smithsonian Institution in charge of the National Museum, which office he continued to fill until his death.

At the time of the Centennial Exposition held in Philadelphia the exhibits of the Smithsonian Institution and National Museum were under the immediate charge of Professor Baird, who promptly invited his favorite assistant to become associated with him in that work, and subsequently much of the installation and other work connected with that exhibition fell under the immediate supervision of Doctor Goode.

His experience led to his preparing a "Classification of the Collection to illustrate the Animal Resources of the United States," concerning which Professor Gill has written:

> "The work was only a catalogue, but perhaps from no other publication can some intellectual qualities be so readily and correctly gauged by a competent judge as an elaborate catalogue. Powers of analysis and synthesis, and the ability to weigh the relative values of the material at hand, may make a 'mere catalogue' a valuable epitome of a collection and of a science."

Later this catalogue was used as the basis for his more elaborate "Catalogue of the Collection to illustrate the Animal Resources and the Fisheries of the United States."

The results of Doctor Goode's work in Philadelphia were so satisfactory that a few years later a similar work with greater responsibilities was assigned to him, and he was made United States Commissioner at the Berlin Fisheries Exposition in 1880. Again, he served in a similar capacity at the London International Fisheries Exposition in 1883. The exhibits of the Smithsonian Institution and National Museum at the expositions held in this country in New Orleans, Cincinnati, Louisville and Atlanta,were represented by Doctor Goode, who also was a member of the Government Board at each one of these exhibitions.

In connection with the World's Columbian Exposition held in Chicago during 1893 he was especially conspicuous, preparing for that exhibition a plan of classification that formed the basis of the arrangement subsequently adopted by the officials for the installation of the exhibits.

Doctor Goode also served in connection with the Columbian Historical Exposition that was held in Madrid, Spain, during the winter months of 1892-1893, and after the death of Doctor James C. Welling, who was Commissioner-General, he acted in that capacity, preparing the official report to the Government.

In connection with the exhibition at Atlanta, it is interesting to add that it was Doctor Goode who appreciated the ambition of the Daughters of the American Revolution in Georgia to secure a home, and promptly turning to his fellow members in the Sons of the American Revolution, of which he was a conspicuous officer,in Washington City, he obtained their aid in presenting the Massachusetts Building, which was a copy of the old Craigie House in Cambridge, once occupied by Washington as his headquarters, and later by Longfellow, and which, in consequence of his efforts, became the first Colonial Hall of the Daughters of the American Revolution in the United States.

Doctor Goode's services at these various expositions were recognized by diplomas and medals, and from the Spanish Government for his services in Madrid he received the Order of Isabella the Catholic, with the grade of Commander.

His bibliography was very extensive and included numerous contributions to scientific societies on various topics in connection with natural sciences, chiefly in the line of ichthyology. The most important of his larger publications were--

"The Natural and Economical History of the American Menhaden."
(Washington,1879).

"American Fisheries--A history of the Menhaden."
(New York,1880).

"The Fisheries and Fishery Industry of the United States."
(Washington,1884).

"American Fishes. A popular treatise upon the Game and Food Fishes of North America." (New York,1888).

"Game Fishes of the United States."
(New York, 1879-1881).

"Oceanic Ichthyology." (Washington,1895).

Doctor Goode was a prominent member of scientific and historical societies both in this country and abroad, chief among which were the Zoological Society of London and the National Academy of Sciences in the United States. To the latter of these he was elected in 1888. The honorary degrees of Ph. D. and LL.D. were conferred upon him, and in other ways testimonials of the appreciation in which he was held by the community were conferred upon him.

In this brief summary of the chief events of Doctor Goode's life some faint idea may be gathered of the great work which he accomplished, reaching out, as it did, in many directions and contributing so much to the welfare of his fellow men. His loss is a serious one, and it will be hard to find one to adequately supply his place in the various enterprises which he

so successfully carried on.

This is not the place in which to dwell upon the social qualities of Doctor Goode, it is sufficient to say that no one knew him but to love him.

IN MEMORIAM

Robert Edward Earll.

Robert Edward Earll was born in Waukegan, Illinois, on August 24, 1853, and died at Chevy Chase, near Washington, on March 19, 1896.

He was graduated at the Northwestern University, where in 1877 he received the degree of S.B., and three years later that of S.M.

Mr.Earll promptly entered the service of the United States Fish Commission, then under Professor Baird, as a fish culturist, and a year later was transferred to the scientific staff. From 1879 to 1882 he was engaged in the Fisheries Division of the Tenth Census.

In 1883 he was sent to the International Fisheries Exhibition held in London, where he rendered very efficient service as an executive officer and deputy representative. The ability which he showed in that connection led to his being designated as chief executive officer for the exhibits of the Smithsonian Institution and United States National Museum for all the expositions that have since been held, including those

at Louisville, New Orleans, Cincinnati, Chicago and Atlanta, serving in this capacity chiefly under Dr.Goode, who recognized his fine administrative ability and regarded him as "one of the most efficient exposition experts living."

Subsequent to his return from London he was Chief of the Division of Statistics in the Fish Commission, where he remained until 1888, when he became connected with the National Museum, holding the office of Curator and also serving as Editor of the Proceedings and Bulletins of the National Museum.

Mr.Earll was highly regarded by his associates in the Fish Commission as a skillful fish culturist, and his unselfish devotion to his work as well as his absolute trustworthiness made him a man whose loss was severely felt by his associates in the National Museum and elsewhere.

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IN MEMORIAM

Renick Seymour Matthews.

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Renick Seymour Matthews was born near Clinton, Indiana, on January 4, 1872, and died in Atlanta, Georgia, on November 14, 1895.

He was educated at the Rose Polytechnic Institute in Terre Haute, where he took the course of mechanical and electrical engineering.

According to his father"the passion of his life was the study of birds and before he was sixteen he made a large collection of birds eggs and nests." In doing this he systematically made note of the habits of birds, the construction of their nests, etc., with the intention of writing a history of the birds frequenting that part of Indiana near his home.

His devotion to natural history brought him into correspondence with the officials of the National Museum, and an appointment as assistant to the Curator of Mammals soon followed

He was chosen to accompany the exhibits of the National Museum to the exposition at Atlanta, and while there contracted the disease which resulted in his early death.

Mr. Matthews' character commanded the esteem and regard of his associates, and in his death a promising career was untimely cut short.

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REPORT OF THE REPRESENTATIVE

# of the

U.S. Commission of Fish and Fisheries.

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Under the act of Congress approved August 18,1894, providing for the participation of the Executive Departments, the Smithsonian Institution, the National Museum, and the Fish Commission in the Cotton States and International Exposition at Atlanta, Georgia, for the purpose of illustrating the functions of the several Departments and Bureaus, the Commissioner designated Dr. Tarleton H. Bean, Assistant in Charge of the Division of Fish Culture, as the Representative of the Commission on the Board of Management. Upon the resignation of Dr. Bean May 23rd, 1895, to accept the position of superintendent of the Aquarium at Castle Garden, New York, W. de C. Ravenel was designated as his successor.

PLAN AND SCOPE OF THE EXHIBIT.

The plan of the exhibit as laid out by the Representative and approved by the Commissioner was as follows:

(1). The scientific investigation of the Commission, to be illustrated by models of the vessels employed, with full sized forms of the apparatus used; by charts illustrating the

results obtained, and publications covering the different investigations; by casts of fish colored from life; collections of sponges, corals, oysters and other shell fish, crabs, lobsters, sea lilies, sea pens, and various other material obtained by dredging and trawling apparatus.

(2). The fish cultural operations, to be shown by models and photographs of hatching stations; models and full size specimens of apparatus used in the collection, transportation and hatching of eggs; apparatus used in the transportation of fish; charts showing a summary of work done since the organization of the Commission; results obtained with reference to special fisheries, and results at the different stations of the Commission during the fiscal year 1894-95; also by the practical hatching of eggs of the salmon, white-fish and trouts.

(3). Methods and statistics of the fisheries, to be illustrated by models of vessels and boats used in the fisheries of the United States with special reference to the South Atlantic and Gulf regions; models and full size specimens of seines, gill nets, pound nets, lines, trawls, spears and accessories; charts showing the extent and value of the fishing industry, besides illustrations of the various fisheries by means of photographs, oil paintings, etchings, etc.

(4). An aquarium for showing the economic food and game fishes of the South Atlantic and Gulf States, and the fishes reared by the U.S.Fish Commission at its various stations,

including some of the ornamental fishes and other marine life of the Gulf of Mexico.

PREPARATION OF THE EXHIBIT.

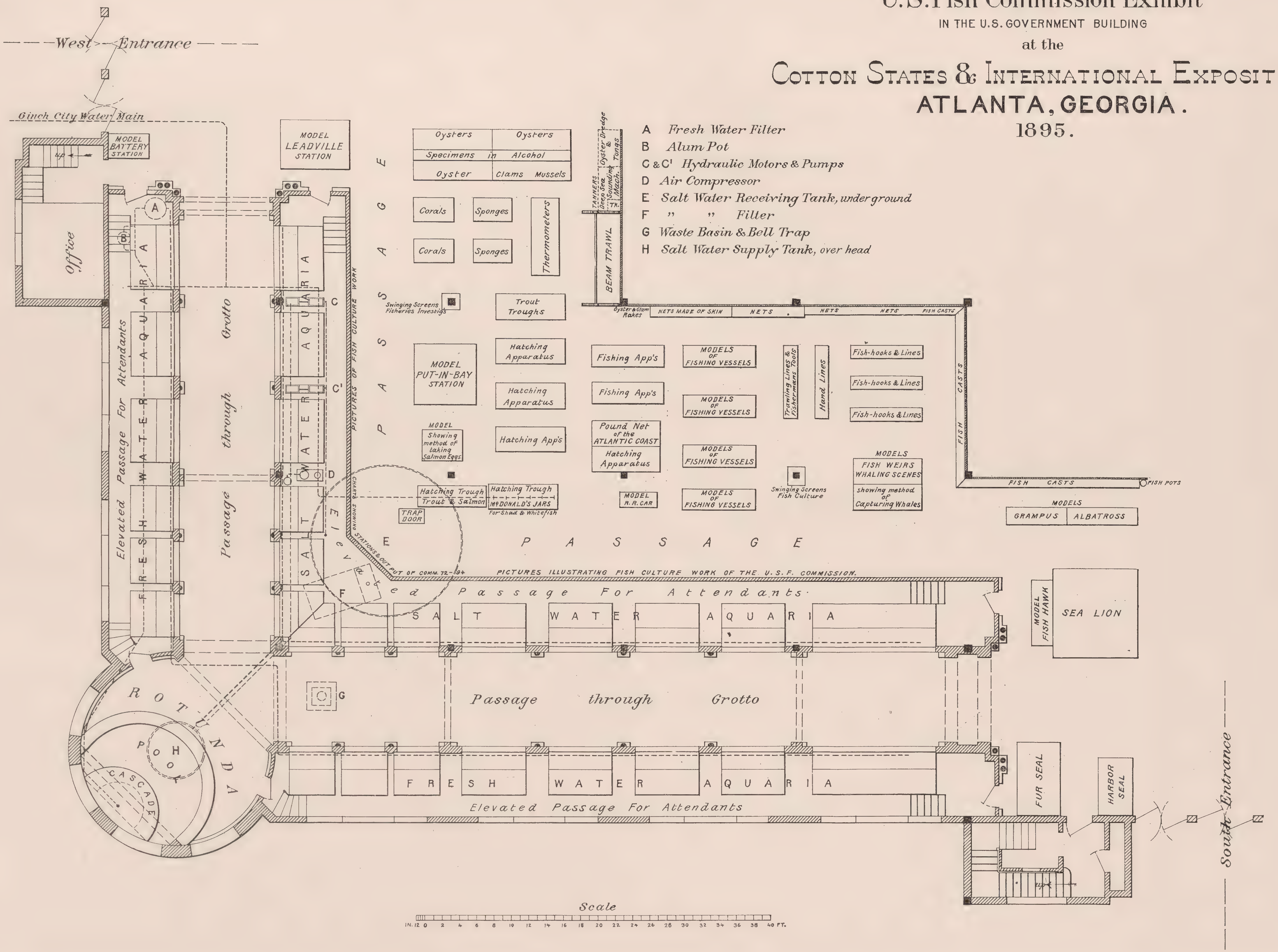
As soon as practicable after the formal organization of the Board and allotment of funds and space had been made, steps were taken to prepare the plans for the Aquarium, which was the most difficult and expensive part of the Exhibit. Mr. H.Von Bayer, the architect of the Commission, was detailed to assist the Representative, but owing to pressure of other duties he was unable to give his time to the work, and it became necessary to employ L. F. Graether as architect. He, with the assistance of Mr. Von Bayer, prepared the plans, which were approved May 1, 1895. In April the work of collecting, preparing and packing the material for the exhibit was begun, and a building was rented as a temporary workshop and storehouse. Mr. W. P. Sauerhoff, fish culturist, was detailed to take charge of the preparation of fish cultural material and the packing of the exhibit, and by the end of July most of it had been prepared and shipped to Atlanta. The material for illustrating the scientific investigations of the Commission was designated by Mr. Richard Rathbun, Assistant in Charge of the Division of Scientific Inquiry, and prepared for exhibit by Mr. Jas. E. Benedict. Dr. H. M. Smith, Assistant in Charge of the Division of Statistics and Methods of the Fisheries, assisted by Mr. W. H. Abbott, designated and prepared the mate-

rial illustrating the methods and statistics of the fisheries.

INSTALLATION.

Messrs. W. P. Sauerhoff and John L.Leary left Washington for Atlanta on August 11 for the purpose of unpacking the material and placing the cases in position. On September 1 the Representative arrived and commenced the installation, with the assistance of W. H. Abbott, to whose ingenuity and skill in exposition work much of the success attained is due. The total space allotted to the Commission was 8000 square feet in the southwest corner of the Government building. Two-thirds of this was occupied by the Aquarium and the balance by fish cultural apparatus and material illustrating scientific investigation and methods of the fisheries, as shown by accompanying floor plan. It was not deemed necessary to prepare a complete descriptive catalogue of the material exhibited, as it is described in the various publications of the Commission, but the plan and scope of the several sections are shown by the following synopsis:

DIAGRAM
U.S. Fish Commission Exhibit
IN THE U.S. GOVERNMENT BUILDING
at the
COTTON STATES & INTERNATIONAL EXPOSITION
ATLANTA, GEORGIA.
1895.



A Fresh Water Filter
B Alum Pot
C & C' Hydraulic Motors & Pumps
D Air Compressor
E Salt Water Receiving Tank, underground
F " " Filter
G Waste Basin & Bell Trap
H Salt Water Supply Tank, over head

SYNOPSIS OF THE EXHIBIT OF THE U.S.FISH COMMISSION.

Scientific Inquiry Section.

1. Laboratories for marine exploration.
   - Illustrations of zoological stations.
     1. Laboratory at Woods Hole, Mass.,1875.
     2. Laboratory at Woods Hole, Mass.
2. Exploring vessels.
   - Models:
     1. Steamer "Albatross."
     2. Steamer "Fish Hawk."
     3. Schooner "Grampus."
   - Illustrations:
     1. Steamer "Albatross"
     2. Steamer "Fish Hawk"
     3. Schooner "Grampus"
3. Collecting apparatus.
   - Nets:
     1. Seines.
     2. Beam trawls.
     3. Towing nets.
   - Dredges:
     1. Naturalists' deep sea dredge.
     2. Naturalists' boat dredge.
     3. Chester rake dredge.
     4. Oyster dredge.

Tangles.

4. Accessories for dredging and trawling.
   Dredge rope:
      1. Steel wire dredge rope.
         Splices in dredge rope.
   Weights for beam trawl.
5. Apparatus for assorting collection.
   Sieves:
      1. Table sieves.
      2. Hand sieves.
6. Apparatus for preserving collections.
   Tanks, jars, etc.
7. Apparatus for deep sea sounding.
   Sounding machine:
      1. Tanner sounding machine.
      2. Tanner intermediate towing net.
8. Apparatus for physical observations.
   Thermometers:
      1. Deck thermometer.
      2. Prof. Baird's protected thermometer.
      3. Miller-Casella deep sea thermometer.
      4. Negretti & Zambra thermometer.
   Thermometer cases and accessories.
      1. Wooden cases.
      2. Brass cases.
   Salinometers:

1. Hilgard salinometer.

9. Results of explorations.

Charts.

Collections:

1. Marine animals in alcohol.

a. Deep sea animals; Crinoids, corals, crabs, sea pens, starfish, sea urchins, etc.

b. Surface animals: Entomostraca, etc., etc., forming food of fish.

c. Shallow water animals: Mollusks, crustaceans, etc.

2. Marine animals dry:

a. Foraminifera.

b. Sponges.

c. Corals.

d. Mollusks, etc.

Division of Fish Culture.

10. Transportation apparatus.

Apparatus for collecting and carrying eggs:

Models and specimens; Wroten bucket improved. Collins' can. McDonald crate. Atkins' egg box. Clark's egg case. Clark's whitefish crate. Clark' foreign egg case. Mather transportation can. Trout boxes used in 1872.

11. Apparatus for transporting fry.

Models and full-sized apparatus.

a. Models: Car No.1.

b. Specimens: Stone's transportation can. Automatic transportation can. McDonald trout can. Carp trsnaportation pail. Carp transportation kettle. Wood bound can, full size. Messenger's complete outfit. Bucksport transportation can. Ferguson's transportation can. Fish Commission transportation can. Stranahan's transportation keg. Box for native food fishes.

c. accessories: Siphon strainer. Siphon tube, bag and cage. Dip nets of various sizes. Water bucket.

12. Hatching apparatus.

Models and specimens:

a. For floating eggs: Chester cod box. McDonald cod box. McDonald hatching bucket. Ferguson's submerged bucket.

b. For semi-buoyant eggs: Wroten's bucket. Green's shad box. Brackett's shad box. Ferguson's submerged bucket. Bell-Mather shad cone. Models of cones and buckets. Chase's whitefish jar. McDonald jar, old style. McDonald universal hatching jar. Clark's jar.

c. For heavy eggs: Garlick's hatching box. Stone's charred trough. Cost's hatching grills. Stone's salmon basket. Bucksport hatching trough. Holton's hatching box. Clark's hatching trough. Mather's hatching trays. Atkins' hatching crate.

d. Working models:

1. Whitefish table, 8 ft. long, 3 ft. wide, and 3 ft. high, fitted with 12 McDonald hatching jars, for hatching whitefish eggs.
2. Two hatching troughs 8 ft. long, 12 inches wide and 8 inches deep, equipped for hatching quinnat salmon and lake trout eggs.

e. Accessories: Spawning pans. Spawning buckets. Page's egg scale. Egg funnels for whitefish and shad. Series of nets from Central Station, Washington, D.C. Series of nets from Northville Station, Michigan. Series of nets from Battery Station, Maryland. Nippers, brass and wood. Dippers. Strainer dippers. Hume's spawning box. Pan for washing eggs. Salmon dip net. Tray for washing eggs. Siphon bags. Siphon cages. Siphon tubes. Aquaria.

13. Hatching and rearing establishments.

Models of hatching establishments.

- a. Hatching houses, Put in Bay, Ohio, and Leadville, Colorado, Havre de Grace, Md.
- b. Floating hatchery, Hatching barge.

Illustrations of hatching stations showing buildings, exterior and interior, methods employed in collecting, hatching, rearing and distributing fish, fry and eggs.

- a. Green Lake; Grand Lake Stream; Bucksport and Craig Brook, Maine; Gloucester cod station and Woods Hole, Mass., Central Station and Fish Commission fish ponds, Washington, D.C.; Battery Station, Havre de Grace, Md.; Bryan Point shad station, Md.; Wytheville Station, Va.; Duluth Station, Minn.; Alpena and Northville Stations, Michigan; Put in Bay Station, Ohio; Quincy Station, Illinois; Neosho Station, Missouri; Leadville Station, Colorado; Fort Gaston, McCloud and Baird Stations, California; Clackamas Station, Ore.
- b. Floating stations: Hatching barge; Steamer Fish Hawk.

14. Methods and results of fish culture.

Models:

- a Lay figure illustrating method of taking salmon eggs.

Charts.

a. Giving names and locations of stations and output of each for the fiscal year 1894-95.

b. Showing work of the Commission from 1872 to 1892.

c. Showing the effect of fish culture on the shad fishery.

Painted casts of fishes reared by the Fish Commission.

a. Brook trout 1, 2, 3 and 4 years old; von Behr trout 1, 2, 3 and 5 years old; Loch Leven trout 1, 2, 3 and 6 years old; lake trout 1 and 2 years old; landlocked salmon 1 year old; rainbow trout 1 and 4 years old. Whitefish 5 years old. Carp, tench, goldfish, black bass, etc.

Fisheries Section.

15. Objects of the fisheries.

Mammals:

1. Sirenians.

Manatee (cast)

2. Cetaceans.

a. Dolphins:

Blackfish (Cast) Head.

Grampus (Cast) Head.

Harbor porpoise (casts) Young.

b. Sperm whales.

Sperm whale (models)

3. Carnivores:

a. Earless seals.

Harbor seal. (mounted group)

b. Eared seals.

Northern fur seal (mounted group)

Steller's sea lion (mounted group.

Batrachians:

1. Frogs:

Bull frog (cast)

Green frog (cast)

Pickerel frog (cast).

Fish:

Casts of 150 species of marine and fresh water food fishes.

Drawings of and notes on the important fishes of the Southern States.

Living marine and fresh water fish in Aquarium.

Invertebrates:

Living sea anemones, star fish, crabs, lobsters, mollusks, algae, etc., etc., in Aquarium.

16. Fishery apparatus.

Vessels:

1. Series of models showing the development of fishing vessels from settlement of America to the present time.

2. Models of vessels used in the important fisheries of the South Atlantic and Gulf States.
3. Pictures of vessels.

Boats:

Models of types used in important commercial fisheries.

Canoes:

Skin kyak from Alaska used in capture of seals, sea lions, etc.

Nets:

1. Pounds.
2. Weirs.
3. Pots.
4. Seines.
5. Cast-nets.
6. Dip-nets.
7. Trawls.
8. Dredges.

Lines:

1. Trawl lines.
2. Hand lines.

Accessories: Disgorgers, hook extractors, etc.,etc.

Appliances for seizing:

1. Rakes for oysters and clams.
2. Tongs.
3. Hooks for sponge.
4. Mackerel and squid jigs.

Accessories: Water glass used in sponge fishery.

Appliances for striking:

1. Spears.

17. Illustrations of Fisheries.

Fishermen.

Fishermen's dwellings.

Fishing towns.

Special fisheries:

1. Mammals.
2. Reptiles.
3. Fishes.
4. Mollusks.
5. Crustaceans.
6. Sponges.

18. Statistics of Fisheries of the United States.

CONSTRUCTION OF AQUARIUM.

Proposals for the construction of the Aquarium were solicited by advertising in newspapers published in Washington, New Yprk, Atlanta and Savannah, but when the bids were opened on May 15, they were found to be too high, and were all rejected. This was due chiefly to the fact that the class of work required was unusual and not understood by the firms making the bids. As the time was getting short and there was no reasonable hope of getting satisfactory bids by further advertisement, contracts were made with the following parties for the construction of

certain portions of the Aquarium: Peters and Pahl of Washington, D.C., for the construction of the wood, mason and iron work; Koppe Brothers and Steinichen of Atlanta, for the stucco work and figures; O.Pause of Atlanta, for the painting and decoration of grotto. All of the work was to be done under the direction of L. F. Graether, and in accordance with accompanying plans and specifications. The contracts provided for the completion of the work by August 10, 1895, but owing to delay in completing the Government building and the difficulty experienced by the contractors in obtaining proper material in the vicinity of Atlanta, they were unable to finish it in the time specified, and it was necessary to extend their contracts. Mr. Graether continued to supervise the work until August 23, when he resigned and was succeeded by Mr. Von Bayer, who remained in charge until its completion. The machinery and piping for circulating the salt water and air and for filtering the fresh water was put in under the direction of I. S. K. Reeves, P. A. Engineer, U.S.N., who arrived in Atlanta August 4th, 1895, and remained until that portion of the plant was completed. Mr. L. G. Harron, superintendent of the Aquarium at Central Station, having been detailed by the Commissioner to assist in connection with the exhibit, was ordered to Atlanta on August 6 to assume the superintendency of the Aquarium, and to arrange for the interior decoration of the tanks and the preliminary installation of salt water, plants, etc. Notwithstanding the numerous delays and difficulties encountered in the

construction of the Aquarium, it was complete and thoroughly stocked with salt and fresh water fishes and other animals by September 18, when the Exposition was opened.

The space occupied by the Aquarium was L shaped, 28 ft. wide and 150 ft. long. Arched grottoed were constructed the whole length, and a rotunda with a dome connected the two arms of the L. Twenty-eight aquaria were placed in this grotto, 14 for salt and 14 for fresh water fish, the sizes being as follows: two 14' long, 3' high and 5' across the top; fourteen 7' X 3' X 5', and twelve 5' X 3' X 5'. The main wall of the Exposition building formed one side of the grotto construction, and the exterior of the other consisted of a handsomely panelled wood partition, separating the grotto from the general Exposition hall. All light entering the grottoes had to pass through the aquaria tanks except what little entered through the open end doorways. The main passage in the grotto was 12 ft. wide, and between the rear of the aquaria and the exterior of the grotto was a passage way for the use of the attendants to the aquaria. The faces of the tanks were of polished French plate glass 3 X 7 ft. and 1 inch thick, and they were decorated on the inside with white sand, rocks and aquatic plants. The exterior partition facing the general exposition hall was arranged so that it could be used as a picture gallery. Its architecture was of the early renaissance style, constructed as a pilaster treatment, and finished at the top throughout its entire length with a delicately conceived entablature, bearing a series of urns. The frieze of this entablature was divided by construction of the Aquarium, it was complete and thoroughly stocked with salt and fresh water fishes and other animals by September 15, when the Exposition was opened.

The space occupied by the Aquarium was L shaped, 22 ft. wide and 150 ft. long. Arched grottoed were constructed the whole length, and a rotunda with a dome connected the two arms of the L. Twenty-eight aquaria were placed in this grotto, 14 for salt and 14 for fresh water fish, the sizes being as follows: two 14' long, 3' high and 5' across the top; fourteen 7' X 3' X 5', and twelve 5' X 3' X 6'. The main wall of the Exposition building formed one side of the grotto construction, and the exterior of the other consisted of a handsomely panelled wood partition, separating the grotto from the general Exposition hall. All light entering the grottoes had to pass through the aquaria tanks except what little entered through the open and doorways. The main passage in the grotto was 12 ft. wide, and between the rear of the aquaria and the exterior of the grotto was a passage way for the use of the attendants to the aquaria. The faces of the tanks were of polished French plate glass 3 X 7 ft. and 1 inch thick, and they were decorated on the inside with white sand, rocks and aquatic plants. The exterior partition facing the general exposition hall was arranged so that it could be used as a picture gallery. Its architecture was of the early renaissance style, constructed as a pilaster treatment, and finished at the top throughout its entire length with a delicately conceived entablature, bearing a series of urns. The frieze of this entablature was divided by triglyphs into ornamental panels, in which were inserted bas-reliefs, representing aquatic life. Two semicircular arch-ways, one on the south, the other on the west, gave admittance to the grotto. These entrances were flanked on each side by Ionic colonnades and surmounted by panelled and ornamented arches and soffits. The keys to the arches formed a group, representing a youthful Poseidon taming an aquatic monster, and the whole was finished at each end above the entablature by statuary representing a fisherman gathering fish and a female planting fry in the waters of the country. An ornamental net gracefully suspended between the urns above the entablature, spanned the entire front and sides of the grotto, giving final finish to the outside of the structure. The whole of the outside was finished in ivory white and gold.

On entering the doorways a series of grottoes could be seen forming a passage to the rotunda. The ceilings of these grottoes were formed by groined fan or funnel arches, supported by Romanesque columns, pedestals and brackets. The space between each pair of columns formed a bay for one tank. The bases and sides of these bays were treated in rusticated stone work. The ribs and spandrils of the ceiling were tinted, those of the arched ceiling being blended from a sky blue above to a sea green below. The spandrils formed on the walls were embellished by paintings of aquatic animal and plant life. The columns, caps and bases were made of imitation Numidian marble and the rustic work in imitation of natural stone. Each of the

caps to the columns were carved differently, and represented fish, lobster, and other aquatic animals. Over each tank was a semicircular sash, containing ornamental cathedral glass of various shades, which permitted only subdued light to enter the grottoes. The passageway through the grotto led to a large circular rotunda surmounted by a semicircular dome, the soffit of which was embellished throughout with cassettes graduated from the springer line to the eye of the dome. The motive chosen for the ornamented parts of the cassettes was the water lily. A few of the panels were glazed for the purpose of securing a more brilliant light effect on the interior of the dome and the waters of the cascade, and the sides of the rotunda were wainscotted with a richly ornamented pilaster treatment. The dome contained a large horse-shoe shaped basin, surmounted in the rear by an imposing arch with relief shell work, from the center of which a cascade issued. The sides of this basin represented regular rustic stone work, and the coping of the basin walls consisted of a bronze cast iron capping ornamented in water lilies. The cascade was enriched by an arrangement of natural rock and plants, and by artistic representations of manatees, otter, sea-gulls, etc., executed in natural size.

WATER SUPPLY.

The water for the fresh water side of the Aquarium was supplied from one of the three mains laid to the Government building and connected with the city water supply, which is taken from the Chattahoochee River. Before entering the aquarium this water was passed through a pressure filter of the Jewell pattern,

having a capacity of 20,000 gallons per hour, but as it had already been filtered at the city water works by the alum coagulated process, it was unnecessary to use the alum provided by the Jewell filter. After passing through the filter the water was conducted to the aquaria through 1-1/2" galvanized iron pipes, fitted with 1/4" brass jet cocks, and arranged horizontally above them. The waste water was carried off by means of an overflow pipe placed in the end of the aquaria near the top, and discharged into a trough emptying into a man hole connected with one of the sewers.

The salt water for the Aquarium was obtained at Morehead City, North Carolina, and transported in three tank cars loaned by the Standard Oil Company. It reached Atlanta August 23rd, and was unloaded as soon as possible and placed in a large tank constructed for it under the aquarium. Its density when shipped was 1.021, temperature 80°; five or six days later its density remained the same but the temperature had fallen to 78°, and it was in excellent condition.

The two pumps used for circulating the water were of the Erwin-Welch pattern, having a power cylinder 4 inches in diameter, pump cylinder, 5 inches, stroke, 6-1/2 inches, suction inlet to pump, 2 inches in diameter, discharge 1-1/2 inches. The power ends were of brass and the pumping ends of block tin hardened. They were built to operate under a minimum water pressure of 50 pounds, and were so designed as to lift the water through their suction a distance of ten feet and deliver it to a tank 30 ft. above, each pump delivering 900 gallons per hour.

The pumps could be operated together or singly, but better results were obtained by operating them together. The water for running them was taken from the main located under the Government building, the average pressure being about 80 lbs. per sq. inch, though it was often as low as 60 and sometimes went as high as 125 lbs. The salt water was forced from the large reservoir below the floor by means of the pumps into the distributing tank, located in the southwest tower of the main building 25 ft. above the aquaria, from which point it was distributed by gravity through asphalt-lined iron piping, fitted with 1/4 inch hard rubber jet cocks. The water was fed into the aquaria through 1/8 inch glass nozzles attached to rubber hose leading from the rubber cocks, which delivered it at the surface and forced air in with it. In addition to the surface supplies each aquarium wasarranged so that water could be introduced at the bottom with 1/2 inch hose. The overflow was the same as on the fresh water side, except that it emptied into a filter box connected with the reservoir tank, and was thus filtered over and over again. The filter was a pine box 7' 6" long, 3' 10" wide and 16" deep, filled with gravel of different sizes, varying from 2" to 1/4" in diameter, laid in courses, and covered with 2 inches of clean sand. The capacity of this filter was 1400 gallons per hour.

In November, finding that the temperature of the water was getting too low for the salt water fishes from the Gulf, a heater was made for regulating it. This was 8 ft. long, and made of 2 inch galvanized iron pipe, arranged like the ordinary

return bend steam heater. Under each section of the pipe 16 gas jets were placed, and the entire apparatus was encased in a steel box. The heater was placed in the tower and so connected that all of the salt water could be passed through it before entering the supply tank. By this means there was no difficulty in keeping the water at an even temperature of from 60 to 63 when the air temperature was below the freezing point.

In order to provide the necessary amount of air to the Aquarium a vertical hydraulic air pump or compressor of the Bishop & Babcock pattern was erected between two of the aquaria on the salt water side. The water power cylinder of this pump is 4-1/8" in diameter, the air cylinder (situated above the water cylinder) 6", and the stroke 8". The pumps deliver the air into the galvanized iron cylinder, where a pressure of about 7 lbs. per square inch is maintained, and from there it is fed through a 3/8" pipe along the backs of the aquaria. At the back of each one the pipe is connected with rubber tubing, which passes down the back to the bottom of the tank. At the end of the tubing is a hard rubber cylinder into which wooden liberators are introduced for forcing the air into the water in minute globules. The air and water circulating plants were so arranged as to be entirely independent of each other, so that in case the water supply being cut off it was possible to maintain the air circulation.

COLLECTION OF FISHES FOR THE AQUARIUM.

The primary object being to show the commercial fishes of the South, the collecting points chosen were Morehead City, N.C., and Pensacola, Florida, as they are important commercial fishing centers, and were accessible by rail. Mr. F. P. Hagan, who had had a valuable experience in the collection and transportation of fishes for the World's Columbian Exposition, Chicago, Illinois, made the collections at Morehead City, and transported successfully all the specimens secured at that point and at Pensacola. Lieut. Franklin Swift, U.S.N., in command of the U. S. Fish Commission Steamer Fish Hawk, furnished two excellent loads from Pensacola. Arrangements were also made for securing supplies of anemone, lobsters, starfish, and other marine life from Woods Hole and Gloucester through the superintendents of the stations at those points. These were shipped by express carefully packed in sea weed or moss , and arrived in fairly good condition, considering the temperature existing at the time of shipment, and the length of time they were on route--from 4 to 6 days.

The majority of the fresh water fishes were furnished from the U. S. Fish Commission stations at Quincy, Illinois and Wytheville, Virginia, and from the Fish Ponds at Washington,D.C. Collections were also made from the Neuse River at Newberne,

N.C., and from the Chattahoochee River in the vicinity of Atlanta. Hon. Jno. D. Edmundson, Superintendent of the Fisheries of Georgia, also furnished specimens from a lake near Luluton, Georgia. Fungus developed on those obtained from the Nuese and Chattahoochee Rivers very shortly after their arrival and most of them died in a few days.

The following is a list of fishes and other aquatic animals collected and exhibited during the Exposition.

Sheepshead	45	Striped mullet	34
Croaker	75	Flounder	27
Spots	50	King fish	9
Pinfish	68	Toad fish	23
Pigfish	66	Cavally	43
Sea bass	102	Swell fish	10
Tautog	3	Burfish	44
Trigger fish	18	File fish	14

Sting ray	7	Skate	1
Red drum	15	Pompano	36
Spotted sea trout	11	Red snapper	37
Red grouper	4	Black grouper	17
Mangrove snapper	2	Pensacola snapper	1
Cow fish	23	Lizard fish	11
Hog choker	4	Scup	1
Remora	1	Bat fish	1
Tomgue sole	3	Squirrel fish	3
Salt water catfish	13	Black drum	1
Sea raven	13	Sea robin	8
Spade fish	29	Mummichog	180
Sea anemones	102	Lobster	18
Starfish	20	Conch	25
King crab	9	Blue crab	42
Hermit crab	90	Spider crab	3
Green turtle	1	Golden tench	18
Golden ide	17	Common tench	140
Carp	75	Goldfish	328
Crappie	76	War Mouth bass	60
Black bass	156	Rock bass	70
Suckers	83	Sunfish	67
Yellow perch	61	White bass	10
White perch	22	Gar pike	60
Pike	35	Catfish	67
Dogfish	21	Rainbow trout	28

Black spotted trout	21	Graylings	5
Brook trout	50	Landlocked salmon	106
Alligator	1	Soft shell turtle	2
Snapping turtle	1	Terrapin	7

The average temperature of salt and fresh water for the months of September, October, November and December was as follows:

Month	Salt			Fresh.		
	Max.	Min.	Mean.	Max.	Min.	Mean.
September	75	65	70	81	77	79
October	63	53	58	76	63	69.5
November	64	52	58	62	56	59
December	63	58	60.5	56	48	52

CARE OF THE AQUARIUM.

In addition to the superintendent, there were employed in connection with the aquarium, a machinist, to look after the pumps, filters, etc., 2 night watchmen, and 2 laborers, to clean the aqauria, wash sand in filter, prepare food for the fishes, etc.

The aquaria tanks were thoroughly cleaned once a week, Sunday being selected, as no visitors were allowed in the building on that day. In the fresh water tanks a perforated galvanized iron funnel attached to a rubber siphon was used to

draw the waste food and sediment from the bottoms, and about a gallon of Turks Island salt was distributed in each aquarium once a week as a disinfectant, sixty bushels being used for this purpose during the Exposition. In the salt water aquaria the sediment and other deleterious matter was caught and held in suspension by the sand filter.

The food used was round beefsteak, beef livers, clams and fiddler crabs. The beef and liver were cut into small pieces and care was taken to remove all of the fat and sinews. All of the marine species except the trigger and file-fishes took the beef very readily, especially if it was slightly salted. The trigger and file-fishes were fed entirely on clams. The fiddler crabs intended for food were shipped by express from Pensacola by Lieut. Swift from time to time as they were needed, and no difficulty was experienced in keeping them for an indefinite period in a box of slightly moistened sand. The fish were fed regularly once a day except Sunday, and seemed to thrive after they became accustomed to confinement. The heaviest losses of salt water fishes usually occurred just after their arrival, and were caused, apparently, by bruises received in transportation, though many specimens that were received in a badly bruised condition recovered entirely and were alive when the Aquarium was closed on December 31. A sudden fall of temperature from 65° to 52° in the latter part of October caused the loss of all the pompano, and a number of red snappers, spade and cow fish. This defect in the Aquarium was cured by the fitting up of the heater.

Owing to pressure of other duties the Representative returned to Washington on September 30, leaving Mr. L. G. Harron in charge of the Exhibit with the following assistants: W. P. Sauerhoff, in charge of fish culture, W.A.Roberts, in charge of accounts and office, and R. J. Conway, in charge of machinery. The Aquarium proved the most important and attractive exhibit on the grounds, and was always crowded to its fullest capacity even when the attendance at the Exposition was small. One of the important problems in the construction of an aquarium is to arrange so that it will not become overcrowded. Profiting by our experience at Chicago a passage way 12 ft. wide was provided, but people coming in from both ends soon packed it and it was almost impossible to move either way. This was largely due to the fact that there were fish on both sides of the grotto, and visitors going down one side returned on the other, instead of going out. This might have been avoided by placing a partition down the center of the aisle, but it would have marred the architectural effect of the grotto, which was much admired.

The losses of fresh and salt water fishes were very small after the opening day, when a very heavy loss occurred owing to the high temperature of the water and the insufficient supply, caused by opening up all of the fountains on the grounds. From time to time supplies of fish were brought in from the stations of the Commission and the field collecting stations, so that there was no perceptible change except that as the water

became cooler the supply and varieties of trout were largely increased.

PRACTICAL FISH CULTURE.

To illustrate practically the methods employed at the various stations of the Commission two hatching troughs were fitted up, one with gravel for the hatching and rearing of trout, one with trays for salmon, and a table with 8 McDonald jars for whitefish and other similar eggs. It was hoped that it would be possible to do practical work throughout the Exposition, but owing to the high temperature of the water all the eggs shipped to Atlanta previous to December 4th died after being in the troughs and jars from 2 to 6 days. A consignment of 10,000 lake trout eggs received from Alpena, Michigan, on that date hatched on the 15th with a loss of only 300, thus showing that the previous losses had been due to the temperature of the water and not to the use of alum in its filtration. The water temperature was 54° on the day they were received, but it fell to 45° by the time they had finished hatching. The fry resulting from the eggs were held until the sac was absorbed and then planted in a pond near Atlanta, belonging to Mr. T.J. Barnard. A shipment of 10,000 quinnat salmon eggs received from Baird, Cal., on the 10th attracted a great deal of attention during the closing days of the Exposition, and added greatly to this feature of the Exhibit. The fry hatched from them were planted in Clara Meer, a lake in the Exposition grounds about 30 acres in area. The following statement shows the numbers

and kinds of eggs received and the results obtained from them:

Date	Source of supply	Species	No. eggs received	Water temp. when rec'd.	No. eggs & Fry lost	No. hatched.	Remarks.
Sept. 22	Baird	Salmon	10,000	81°			Sept. 23; all dead
Oct. 7	"	"	5,000	73°			Nov. 8; " "
Oct. 21	Alpena	Lake trout	10,000	66°			Nov. 16; " "
Nov. 1	"	" "	10,000	62°			Nov. 15; " "
Nov. 15	"	Whitefish	800,000	60°			Nov. 16; " "
Dec. 4	"	Lake trout	10,000	54°	1,000	9,700*	Dec. 15; hatched
Dec. 10	Baird	Salmon	10,000	51°	229	9,771*	Jan. 1; "

* Nine thousand fry delivered to Mr. Barnard.

* Fry planted in lake at Piedmont Park.

At the close of the Exposition the fresh water fishes were planted in public and private waters in the vicinity of Atlanta; the majority of the salt water fishes were transferred to Washington and exhibited in the aquarium at Central Station. No attempt was made to remove the grotto as it would have been seriously damaged in taking apart and transporting; besides this The Commission had no facilities for storing it in Washington. The aquaria, pumps, piping, supply and reservoir tanks were taken down and shipped to Washington, and afterwards turned over by the Acting Commissioner to the Commissioners of the

Zoological Park. As soon as arrangements were completed for the disposition of the Aquarium the Representative returned to Washington, leaving W. P. Sauerhoff in charge of the packing and re-shipment of all exhibits. This was completed in February, amd all material borrowed from the Smithsonian Institution was returned in good condition.

ACKNOWLEDGEMENTS.

To the diligence, intelligence, and experience of the employes of the Commission detailed to assist at Atlanta, the Commission owes much of its success, especially to Mr. L. G. Harron, who was in general charge of the Exhibit during the absence of the Representative, and Mr. W. P. Sauerhoff, who had charge of fish cultural work, besides superintending the packing and shipping of all material exhibited.

The Commission is indebted to the Secretary of the Smithsonian Institution for loan of material and cases forming part of its Exhibit, also to the following parties, who contributed largely toward its success:

Hon. Jno. D. Edmundson, Superintendent of Fisheries for Georgia, for assistance rendered in collection of fishes for the Aquarium.

Col. R. H. Payne, Secretary Union Tank Line Company, for loan of tank cars for hauling salt water from Morehead City to the Exposition.

Judge Hillyer, President Atlanta Water Works, for permission to take fish from lake controlled by his Company, and for co-operating in keeping a uniform pressure of water for operating the pumps.

Capt. E. L. Tyler, Chief of Transportation, for loan of water carts for hauling salt water.

M. M. Sullivan and Son, Savannah, Georgia, for assistance in collecting fishes and gift of turtle.

To the Director General and Supervising Architect of the Cotton States and International Exposition, for assistance rendered in connection with the installation of the Aquarium.

W. H. Baldwin, Jr., Second Vice President, Southern Railroad Company, for free transportation of tank cars containing salt water, and special facilities provided for their movement without delay; also for free transportation of U. S. Fish Commission Car No.4 and crew from Washington to Goldsboro, N.C., thence to Atlanta and return.

Gen. George C. Smith, President and General Manager of the Alabama, Atlanta & West Point Railway, for hauling car and crew from Atlanta to Montgomery and return, two trips.

Hon. Milton H. Smith, President Louisville and Nashville Railroad Company, for hauling car from Montgomery to Pensacola and return, two trips.

The South Carolina Railroad Company, for free transportation over its line to Branchville, South Carolina and return.

Mr. F. J. Jette, Superintendent of Transportation, Central Railroad of Georgia, for transportation of car and crew from Atlanta to Albany, Georgia, and return.

COST OF THE EXHIBIT.

The total cost of preparation, maintenance and return of the exhibits of the Commission, including the Aquarium, was $20,689.80. The following statement shows the objects for which the money was expended.

Exhibits and furniture, ...	$ 605.12
Transportation, ...	2,475.95
Installation and maintenance, ...	1,367.48
Packing and re-packing, ...	1,935.22
Miscellaneous expenses, ...	191.52
Construction of Aquarium, ...	10,898.78
Installation and maintenance of Aquarium,	2,372.35
Stocking of Aquarium, ...	843.38
Total:	$20,689.80

W.de C. Ravenel

Representative, U.S. Commission of Fish & Fisheries.